

EXHIBIT B48

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

IN RE: JOHNSON & JOHNSON
TALCUM POWDER PRODUCTS
MARKETING SALES
PRACTICES, AND PRODUCTS
LIABILITY LITIGATION } MDL NO.16-2738 (FLW) (LHG)

VIDEO-RECORDED DEPOSITION OF
WILLIAM E. LONGO, PH.D.

February 5, 2019
10:24 a.m.

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Johns Creek, Georgia

Frances Buono, RPR, CCR-B-791

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| <div>6</div> <div>1 INDEX TO EXHIBITS</div> <div>2</div> <div>3 Defendants' Exhibit Description Page</div> <div>4</div> <div>5 1 Dr. Longo's CV 10</div> <div>6 2 January 15, 2019 report titled The Analysis of Johnson & Johnson's Historical Product Containers and Imerys' Historical Railroad Car Samples from the 1960's to the Early 2000's for Amphibole Asbestos Supplemental Report 10</div> <div>7</div> <div>8</div> <div>9 3 November 14, 2018 report titled The Analysis of Johnson & Johnson's Historical Baby Powder & Shower to Shower Products from the 1960's to the Early 1990's for Amphibole Asbestos 10</div> <div>10</div> <div>11</div> <div>12</div> <div>13 4 ISO 22262-1 standard 11</div> <div>14 5 ISO 22262-2 standard 11</div> <div>15 6 ISO 22262-3 standard 11</div> <div>16 7 February 1, 2019 report titled The Analysis of Johnson & Johnson's Historical Product Containers and Imerys' Historical Railroad Car Samples from the 1960's to the Early 2000's for Amphibole Asbestos, 2nd Supplemental Report 11</div> <div>17</div> <div>18</div> <div>19</div> <div>20 8 Quality Assurance Report, Johnson and Johnson's JBP and STS, Imerys Railcar and Asian Talc for Amphibole Asbestos, January 31, 2019 14</div> <div>21</div> <div>22</div> <div>23 9 Thumb drive containing three reports, November, January, and the March 2018 14</div> <div>24 10 December 12, 2018 letter to Dr. Longo from J3 14</div> <div>25</div> <div>Atlanta Reporters, Inc. 866-344-0459 www.atlanta-reporters.com</div> | <div>8</div> <div>1 (Reporter disclosure made pursuant to</div> <div>2 Article 10.B. of the Rules and Regulations of</div> <div>3 the Board of Court Reporting of the Judicial</div> <div>4 Council of Georgia.)</div> <div>5 (Identification statement by</div> <div>6 videographer.)</div> <div>7 WILLIAM E. LONGO, PH.D.,</div> <div>8 having been first duly sworn, was examined and</div> <div>9 testified as follows:</div> <div>10 EXAMINATION</div> <div>11 BY MR. CHACHKES:</div> <div>12 Q. Good morning, Dr. Longo.</div> <div>13 A. Good morning.</div> <div>14 Q. And my name is Alex Chachkes; I represent</div> <div>15 J&J. We've met before; right?</div> <div>16 A. Yes, sir, we have.</div> <div>17 MR. CHACHKES: Okay. I want to begin the</div> <div>18 depo with an objection to the late productions.</div> <div>19 On Saturday we received a new 92-page report and</div> <div>20 almost 7,000 pages of new back-up material. On</div> <div>21 Sunday we received supplemental reports, two new</div> <div>22 reports from J3 and hundreds of other pages.</div> <div>23 So when we conclude today we are going to</div> <div>24 expressly keep the deposition open subject to</div> <div>25 our analysis of the new production; and if it</div> <div>Atlanta Reporters, Inc. 866-344-0459 www.atlanta-reporters.com</div> |

10:24:58 **1** turns out that it is material that if we had
 10:25:00 **2** gotten earlier we would have asked about today,
 10:25:03 **3** we are going to recall the witness.
 10:25:06 **4** MS. O'DELL: Well, we would object to any
 10:25:08 **5** motion to hold the deposition open. The
 10:25:10 **6** requests that were made for data that was
 10:25:13 **7** supplied on Saturday and earlier in the week
 10:25:17 **8** were late requests, actually only received five
 10:25:22 **9** or I think it was seven days beforehand, they
 10:25:23 **10** were timely produced, and you've had sufficient
 10:25:26 **11** time to review them.
 10:25:27 **12** The supplement that you're referring to
 10:25:28 **13** that was produced on Sunday corrected a couple
 10:25:32 **14** of typographical errors and clarified the
 10:25:37 **15** identification of a sample, none of which is
 10:25:40 **16** sufficient to hold the deposition open, so we
 10:25:42 **17** are going to oppose any such motion. Today's
 10:25:46 **18** your opportunity to depose Dr. Longo on these
 10:25:48 **19** samples.
 10:25:49 **20** MR. CHACHKES: Obviously, we disagree, and
 10:25:51 **21** we thought that material should have been
 10:25:53 **22** produced and we should not have to fight for it,
 10:25:56 **23** but it's a fight for another day.
 10:25:58 **24** So we've premarked some exhibits, some
 10:26:00 **25** things I'm sure we will be coming back to later.
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10:26:02 **1** What I want to do is maybe just go through those
 10:26:04 **2** quickly so they are on the record.
3 (Defendants' Exhibit 1 was marked for
4 identification.)
 10:26:08 **5** Q. (By Mr. Chachkes) Dr. Longo, you can
 10:26:08 **6** confirm what's been marked as Exhibit 1 is your CV;
7 is that correct?
 10:26:15 **8** A. **Yes, sir.**
 10:26:15 **9** Q. And are there any updates to this since we
 10:26:17 **10** received it?
 10:26:18 **11** A. **No, sir.**
12 (Defendants' Exhibits 2 and 3 were marked
 10:26:18 **13** for identification.)
 10:26:18 **14** Q. (By Mr. Chachkes) Okay. What's been
 10:26:20 **15** marked as Exhibit 2 is your January 16 expert report
 10:26:30 **16** extracted --
 10:26:33 **17** MS. O'DELL: November 14.
 10:26:33 **18** Q. (By Mr. Chachkes) I'm sorry. What has
 10:26:34 **19** been marked as Exhibit 2 is your November 14 expert
 10:26:36 **20** report in this matter minus the backup data.
 10:26:39 **21** Can you confirm that?
 10:26:40 **22** A. **This is actually the January 15.**
 10:26:43 **23** Q. So --
 10:26:46 **24** A. **November 14 is Exhibit 3.**
 10:26:48 **25** Q. All right. Let's do that again.
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10:26:49 **1** So Exhibit 2 is your January 16 expert
 10:26:54 **2** report in this matter minus the backup data that was
 10:26:57 **3** attached to it when it was produced; is that correct?
 10:27:00 **4** A. **Yes, sir.**
 10:27:00 **5** Q. Okay. And then Exhibit 3 is your
 10:27:06 **6** November 14 report in this matter which was, I
 10:27:09 **7** assume, superseded by Exhibit 2; correct?
 10:27:12 **8** A. **Correct.**
9 (Defendants' Exhibits 4, 5, and 6 were
 10:27:13 **10** marked for identification.)
 10:27:13 **11** Q. (By Mr. Chachkes) Okay. What's been
 10:27:15 **12** marked as Exhibits 4, 5 and 6, can you confirm that
 10:27:19 **13** these are ISO 22262-1, -2, and -3?
 10:27:29 **14** A. **Yes, sir.**
 10:27:30 **15** Q. So 1 will be 4, 2 will be 5, and 3 will be
 10:27:37 **16** 6.
17 (Defendants' Exhibit 7 was marked for
18 identification.)
 10:27:43 **19** Q. (By Mr. Chachkes) And then what's been
 10:27:45 **20** marked as Exhibit 7 is your second supplemental
 10:27:52 **21** report minus the backup data that was attached to it
 10:27:56 **22** dated February 1, 2019; is that correct?
 10:28:00 **23** A. **Yes, sir.**
 10:28:00 **24** Q. And it's my understanding that this report
 10:28:05 **25** supersedes what's been marked as Exhibit 2; is that
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10:28:12 **1** correct? So it supersedes the January report?
 10:28:15 **2** A. **Yes, sir.**
 10:28:17 **3** Q. And my understanding is that the only
 10:28:19 **4** difference between Exhibit 7 and Exhibit 2 is
 10:28:21 **5** Exhibit 7 corrects some typos?
 10:28:25 **6** MS. O'DELL: Object to the form.
 10:28:29 **7** THE WITNESS: The second supplement
 10:28:30 **8** report, essentially it was to clarification on
 10:28:35 **9** the Lee Poye J&J STS samples, 31F and 31G, and
 10:28:43 **10** it is J&J sample -- hold on, I want to get the
 10:28:53 **11** right numbers. Throws me off on two-sided. 77.
 10:29:28 **12** Q. (By Mr. Chachkes) That's okay. You've
 10:29:30 **13** given me the 31F and 31G. So am I correct in my
 10:29:34 **14** understanding that Exhibit 7 does more than correct
 10:29:38 **15** typos?
 10:29:39 **16** A. **Yes. Exhibit 7 does not have any new**
 10:29:45 **17** **analytical data. The two samples that Lee Poye**
 10:29:48 **18** **had -- and I will just give the numbers -- the 31F**
 10:29:52 **19** **and the 31G I misunderstood. I thought that was**
 10:29:54 **20** **actually two samples from the same container.**
 10:29:57 **21** **It's actually one sample from two**
 10:30:00 **22** **different containers. The STS in it looks like a**
 10:30:03 **23** **gift wrapped for the spice and the regular. So**
 10:30:08 **24** **that's actually two containers for each sample. So**
 10:30:11 **25** **the number of containers was increased.**
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10:30:13 **1 But the analytical data had been already**
 10:30:16 **2 produced. Nothing changed in the analytical data.**
 10:30:19 **3 And then we had some typos that we endeavored to**
 10:30:24 **4 correct.**
 10:30:24 **5 Q.** Okay. And those are typos you found or
 10:30:26 **6** that counsel found?
 10:30:29 **7** MR. CIRSCH: Object to form.
 10:30:31 **8** THE WITNESS: Well, one of them counsel
 10:30:33 **9** found, and that was the counsel for Johnson &
 10:30:35 **10** Johnson, at my previous deposition on MDL.
 10:30:37 **11** There were some positive samples on a chart that
 10:30:40 **12** were negative in the overall data, so I decided
 10:30:43 **13** to go through and make sure everything was
 10:30:45 **14** correct again.
 10:30:47 **15 Q.** (By Mr. Chachkes) What about the other
 10:30:48 **16** typos, you found those or counsel?
 10:30:52 **17** MR. CIRSCH: To the extent -- I would not
 10:30:53 **18** have you reveal, Dr. Longo, anything that's work
 10:30:56 **19** product is protected under Rule 26. But if you
 10:30:58 **20** can answer aside from that, please do.
 10:31:01 **21** THE WITNESS: No, counsel did not
 10:31:02 **22** participate in helping to find typos.
 10:31:04 **23 Q.** (By Mr. Chachkes) Okay. So you found
 10:31:05 **24** them personally?
 10:31:06 **25 A. Personally and Dr. Rigler.**
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1 (Defendants' Exhibits 8, 9, 10, and 11
 10:31:08 **2** were marked for identification.)
 10:31:08 **3 Q.** (By Mr. Chachkes) Okay. And now
 10:31:09 **4** Exhibit 8, if you would look at that, if you could
 10:31:12 **5** confirm, is the January 31 quality control -- quality
 10:31:19 **6** assurance report that you created in this case?
 10:31:22 **7 A. Yes, sir.**
 10:31:22 **8 Q.** Okay. And then Exhibit 9, which is more
 10:31:28 **9** for the record than you because you can't confirm it,
 10:31:30 **10** it is a USB with the three reports in this case, the
 10:31:36 **11** November 1, the January 1, and the recent -- sorry.
 10:31:42 **12** Okay. So it is November, January, and the March 2018
 10:31:46 **13** report are all in full on Number 9. It's just too
 10:31:50 **14** much paper so we put it on the USB.
 10:31:52 **15** Can you confirm that Exhibit Number 10 is
 10:31:59 **16** a letter to you from J3 dated December 12, 2018,
 10:32:04 **17** about the MAS split of 21 historic talc samples by
 10:32:13 **18** XRD?
 10:32:14 **19** MR. CIRSCH: It's actually December 20.
20 MR. CHACHKES: What did I say?
 10:32:20 **21** MR. CIRSCH: December 12.
 10:32:20 **22 Q.** (By Mr. Chachkes) I'm sorry. So it's
23 December --
24 MS. TROVATO: No, you're right. You're
25 right.
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10:32:20 **1** MR. CHACHKES: So which ones, then?
2 MS TROVATO: December 12 is 10.
 10:32:22 **3 Q.** (By Mr. Chachkes) Okay. So December 12
 10:32:23 **4** is Exhibit 10; is that correct?
 10:32:26 **5 A. Yes.**
 10:32:28 **6 Q.** Okay. You should probably look at your
 10:32:30 **7** own copies, not mine.
 10:32:31 **8 A. Did I get a copy?**
 10:32:33 **9 Q.** Yes, you did.
 10:32:34 **10 A. Okay. Sorry.**
 10:32:35 **11 Yes, that's correct.**
 10:32:36 **12 Q.** Okay. And Exhibit Number 11, we
 10:32:40 **13** premarked, is another letter from J3 dated
 10:32:44 **14** December 20 to you; correct?
 10:32:46 **15 A. Correct.**
 10:32:46 **16 Q.** All right.
 10:32:52 **17** MR. CIRSCH: I'm sorry again, but
 10:32:55 **18** Exhibit 10 I have says December 20 as well, so
 10:32:57 **19** maybe that's -- okay. I just got two of them.
 10:33:00 **20** Never mind.
 10:33:04 **21 Q.** (By Mr. Chachkes) You received your
 10:33:06 **22** doctor's in philosophy in materials science and
 10:33:08 **23** engineering; correct?
 10:33:10 **24 A. Yes.**
 10:33:10 **25 Q.** You're not a geologist?
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 10:33:12 **1 A. I am not a geologist.**
 10:33:13 **2 Q.** You're not a mineralogist?
 10:33:15 **3 A. I did not take any courses in mineralogy.**
 10:33:17 **4 Q.** Do you consider yourself an expert in
 10:33:19 **5** mineralogy?
 10:33:20 **6 A. Usually that's up to the courts.**
 10:33:22 **7 Certainly I believe I have more knowledge than the**
 10:33:25 **8 average layperson, but I do not hold myself out with**
 10:33:28 **9 any degrees in mineralogy.**
 10:33:29 **10 Q.** Okay. You're not a certified industrial
 10:33:31 **11** hygienist?
 10:33:31 **12 A. No, I'm not.**
 10:33:33 **13 Q.** You've done exposure assessments, though;
14 correct?
 10:33:37 **15 A. Yes.**
 10:33:37 **16 Q.** All right. You're an expert in exposure
 10:33:41 **17** assessments?
 10:33:42 **18 A. Again, I'm not sure what that means. I**
 10:33:45 **19 certainly have done a number of studies in which we**
 10:33:48 **20 have determined typical exposures from both**
 10:33:52 **21 asbestos-added construction industrial products as**
 10:33:56 **22 well as what I call hygiene exposure studies**
 10:33:59 **23 involving Johnson & Johnson cosmetic talc samples.**
 10:34:04 **24 Published on our exposure assessments in**
 10:34:06 **25 the past. We use all standard protocols that are**
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10:34:13 **1** accepted by the community of scientists who do this
10:34:17 **2** type of work. Been qualified many times in court as
10:34:20 **3** an industrial hygienist specifically to asbestos.
10:34:23 **4** So again, I have probably more knowledge
10:34:26 **5** than the average layperson on doing exposure
10:34:29 **6** assessment type studies involving asbestos.
10:34:32 **7** Q. When a plaintiff has been exposed to
10:34:34 **8** multiple different talc-based products, each of which
10:34:37 **9** could possibly contain asbestos, is it best to
10:34:40 **10** analyze the asbestos content of each product?
10:34:43 **11** MR. CIRSCH: Object to form.
10:34:46 **12** THE WITNESS: I'm not sure it's required
10:34:48 **13** to analyze each product. You will have to
10:34:51 **14** clarify. Do you mean each different
10:34:53 **15** manufacturer or from different talc sources,
10:34:57 **16** such as the Italian or the Vermont or Montana?
10:35:02 **17** Q. (By Mr. Chachkes) Let's say different
10:35:03 **18** manufacturers. Let's say a plaintiff has been
10:35:06 **19** exposed to talc-based products from three
10:35:08 **20** manufacturers. Is it best to analyze the asbestos
10:35:10 **21** content from each of the three manufacturers?
10:35:13 **22** MR. CIRSCH: Object to form.
10:35:15 **23** THE WITNESS: Certainly we try to do that;
10:35:16 **24** but if three manufacturers all have to use the
10:35:22 **25** talcum powder source is Italy, Italian, I think
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10:35:26 **1** you can imply that if one manufacturer's Italian
10:35:30 **2** talc has measurable levels or detectable levels
10:35:35 **3** of amphibole asbestos, then the other
10:35:40 **4** manufacturer more likely than not would have
10:35:41 **5** similar types of concentrations, depending on
10:35:44 **6** their processing flotation, et cetera.
10:35:46 **7** If you have different manufacturers from
10:35:49 **8** completely different mines and you haven't
10:35:51 **9** analyzed anything from the particular talc mine,
10:35:54 **10** which has happened to me in the past, I
10:35:56 **11** typically say I don't have any opinions.
10:35:58 **12** Q. (By Mr. Chachkes) Okay. If you're trying
10:36:01 **13** to determine which manufacturer's talc contributed
10:36:04 **14** what level of exposure to asbestos, do you need to
10:36:09 **15** analyze all the different manufacturers' products?
10:36:13 **16** MR. CIRSCH: Object to form.
10:36:15 **17** THE WITNESS: Again, it depends on who the
10:36:16 **18** manufacturer is. It's sort of an incomplete
10:36:19 **19** hypothetical.
10:36:19 **20** Q. (By Mr. Chachkes) Okay. Let me complete
10:36:20 **21** it, then.
10:36:22 **22** So hypothetically, if there's three
10:36:23 **23** manufacturers each from a different geological
10:36:26 **24** location, if you're trying to determine the exposure
10:36:29 **25** of a plaintiff, do you need to -- and what percentage
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10:36:34 **1** of the asbestos exposure came from which talc, would
10:36:37 **2** you need to analyze all three?
10:36:39 **3** MR. CIRSCH: Object to form.
10:36:40 **4** THE WITNESS: Again, that's an incomplete
10:36:41 **5** hypothetical. If we had never analyzed any
10:36:44 **6** manufacturer's source of talc from any
10:36:47 **7** particular location, then as I stated earlier, I
10:36:51 **8** would not have an opinion about that particular
10:36:53 **9** manufacturer.
10:36:54 **10** If they come from things like, again,
10:36:57 **11** Vermont, Italy, say the Korean mines, then we
10:37:03 **12** have a pretty good understanding of the levels
10:37:05 **13** of amphibole asbestos that are typically found
10:37:09 **14** in the products from those mines.
10:37:11 **15** Q. (By Mr. Chachkes) Okay. So you feel
10:37:12 **16** confident that you can testify to the amount of
10:37:16 **17** amphiboles you expect in a bottle based solely on the
10:37:19 **18** geography from which the bottle comes?
10:37:23 **19** MR. CIRSCH: Object to form.
10:37:24 **20** THE WITNESS: I didn't say that.
21 Q. (By Mr. Chachkes) Okay.
10:37:25 **22** A. **What I would say is we have analyzed a**
10:37:27 **23** **number of samples from other manufacturers, two**
10:37:32 **24** **different manufacturers, three different**
10:37:33 **25** **manufacturers, where, say, the source is Italy, so I**
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10:37:36 **1** **know that there will be significant concentrations in**
10:37:39 **2** **some percentage of the samples.**
10:37:40 **3** Q. Okay. So let's say you have three bottles
10:37:43 **4** from three geographical locations that you haven't
10:37:46 **5** analyzed in the past. Do you need to analyze each
10:37:48 **6** bottle to determine the percentage of asbestos
10:37:51 **7** exposure per manufacturer?
10:37:55 **8** MR. CIRSCH: Object to form.
10:37:56 **9** THE WITNESS: When you say each bottle, I
10:37:58 **10** have five from each or two from each or ten from
10:38:01 **11** each?
10:38:01 **12** Q. (By Mr. Chachkes) So does it matter?
10:38:04 **13** A. **I don't know. I mean, it's a**
10:38:07 **14** **hypothetical. If we had not tested any samples from**
10:38:10 **15** **any particular geological location, I would not**
10:38:15 **16** **provide opinions on any -- the potential for**
10:38:18 **17** **amphibole asbestos, regulated amphibole asbestos to**
10:38:21 **18** **be in those containers.**
10:38:22 **19** Q. Would you agree it's important to at least
10:38:28 **20** determine a plaintiff's exposure to asbestos on a
10:38:31 **21** comparative basis if there were multiple sources of
10:38:36 **22** exposure?
10:38:38 **23** MR. CHACHKES: Object to form.
10:38:41 **24** THE WITNESS: Depends on the information.
10:38:43 **25** If the particular plaintiff says I use
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10:38:47 **1** manufacturer X, manufacturer Y, manufacturer Z,
 10:38:52 **2** and I used them all 33.33 percent each and they
 10:38:57 **3** all come from the same geological formation of
 10:39:01 **4** where cosmetic talc is being used in those
 10:39:04 **5** containers, then my opinion would be if it is a
 10:39:08 **6** geological location that we have tested in the
 10:39:11 **7** past, that they would all have similar -- that
 10:39:15 **8** the manufacturers would have similar exposures.
 10:39:17 **9** If one of the manufacturers was, well,
 10:39:20 **10** I've got a gift -- for example, if I got a gift
 10:39:22 **11** bag once a year and I would use it and that's
 10:39:26 **12** all, then I would say that the primary exposure
 10:39:28 **13** is from the other manufacturers.
 10:39:29 **14** So it just depends on the circumstances.
 10:39:31 **15** **Q.** (By Mr. Chachkes) Okay. You're not a
 10:39:33 **16** pathologist?
 10:39:34 **17** **A. No, sir, I'm not.**
 10:39:35 **18** **Q.** You have no medical training?
 10:39:37 **19** **A. No, sir, I don't have any medical**
 10:39:39 **20** **training.**
 10:39:39 **21** **Q.** Are you a statistician?
 10:39:41 **22** **A. I'm not a statistician.**
 10:39:42 **23** **Q.** Are you a geostatistician?
 10:39:45 **24** **A. I'm not that kind of statistician either.**
 10:39:48 **25** **Q.** Okay. So in light of the reports that we

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10:40:55 **1** MR. CIRSCH: Object to form.
 10:40:56 **2** THE WITNESS: I don't recall the exact
 10:40:57 **3** words, no.
 10:40:57 **4** **Q.** (By Mr. Chachkes) Okay. Do you agree
 10:40:58 **5** that if you want to know whether there's asbestos in
 10:41:00 **6** talc, you would go to either your lab or Lee Poye's
 10:41:03 **7** lab and that's it?
 10:41:04 **8** MR. CIRSCH: Object to form.
 10:41:05 **9** THE WITNESS: It depends on the
 10:41:06 **10** circumstances. If you're going to understand
 10:41:09 **11** what's your best opportunity to see and get the
 10:41:12 **12** appropriate detection limits, I'm only aware of
 10:41:16 **13** Lee Poye and our lab that use routinely the
 10:41:21 **14** heavy liquid density separation method.
 10:41:22 **15** There may be other labs out there doing
 10:41:24 **16** it, but that's the only two I know at the
 10:41:26 **17** moment.
 10:41:26 **18** **Q.** (By Mr. Chachkes) Okay. So you know of
 10:41:27 **19** no other labs besides yours and Lee Poye that can
 10:41:32 **20** accurately determine whether there's asbestos in
 10:41:35 **21** talc, at least using the concentration method?
 10:41:38 **22** MR. CIRSCH: Object to form.
 10:41:39 **23** THE WITNESS: Accurately determine? It's
 10:41:41 **24** all about getting the best analytical
 10:41:44 **25** sensitivity. So analytical sensitivities and

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10:39:50 **1** have in this case, are you here to testify in your
 10:39:53 **2** capacity as a microscopist; is that accurate?
 10:39:57 **3** MR. CIRSCH: Object to form.
 10:39:58 **4** THE WITNESS: I'm here to testify on the
 10:40:01 **5** qualifications I have and have been accepted in
 10:40:03 **6** the past. I'm a material scientist; I'm an
 10:40:07 **7** industrial hygienist; I have many expertise in
 10:40:10 **8** the analysis of asbestos.
 10:40:13 **9** My testimony in the past has been that any
 10:40:17 **10** particular types of manufacturers where we have
 10:40:21 **11** analyzed the talc and we have analyzed the
 10:40:24 **12** source -- know the source, that more likely than
 10:40:28 **13** not there would have been a significant exposure
 10:40:32 **14** based on the percentages of the samples that are
 10:40:34 **15** positive. That's as far as I go.
 10:40:36 **16** **Q.** (By Mr. Chachkes) You've testified in the
 10:40:38 **17** past the following: In my opinion, if you want to
 10:40:41 **18** know if there's asbestos in talc, you would go to
 10:40:44 **19** either our lab or Lee Poye's lab and that's it.
 10:40:47 **20** Do you recall that testimony?
 10:40:49 **21** MR. CIRSCH: Object to form. Do you have
 10:40:51 **22** a copy of the testimony you can show the
 10:40:53 **23** witness?
 10:40:53 **24** **Q.** (By Mr. Chachkes) Do you recall that
 10:40:53 **25** testimony?

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10:41:48 **1** using the non-heavy liquid density separation
 10:41:50 **2** method for TEM is usually in the low to 10 to 12
 10:41:59 **3** million fibers per gram.
 10:42:01 **4** The heavy liquid density separation can
 10:42:04 **5** reduce that; at least in our lab we have gotten
 10:42:06 **6** as low as 3,000 fibers/bundles per gram. I know
 10:42:11 **7** the R.J. Lee Group used the Blount heavy density
 10:42:16 **8** liquid separation method once for TEM. There is
 10:42:19 **9** an ISO protocol for it, so there may be other
 10:42:21 **10** labs that I'm not aware of.
 10:42:23 **11** **Q.** (By Mr. Chachkes) So are you the only
 10:42:24 **12** lab -- you and Lee Poye -- who can detect 3,000
 10:42:29 **13** structures per gram?
 10:42:32 **14** MR. CIRSCH: Object to form.
 10:42:34 **15** THE WITNESS: I don't know. Anybody
 10:42:35 **16** following the heavy liquid density measurement
 10:42:37 **17** technique should be able to achieve detection
 10:42:39 **18** limits --
 10:42:39 **19** **Q.** (By Mr. Chachkes) Okay.
 10:42:39 **20** **A. -- as such.**
 10:42:40 **21** **Q.** So your opinion about the high
 10:42:43 **22** qualifications of your lab and Lee Poye's lab, it's
 10:42:45 **23** not based on different methodologies; it's just based
 10:42:48 **24** on your opinion that you do it better?
 10:42:50 **25** MR. CIRSCH: Object to form.

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10:42:51 **1** THE WITNESS: Well, it's not really doing
10:42:52 **2** it better; it's just following the appropriate
10:42:54 **3** protocol for the analytical sensitivities.
10:42:57 **4** There may be other labs out there. John
10:43:00 **5** Fitzgerald's lab may be doing it now. I don't
10:43:01 **6** know.
10:43:03 **7** Q. (By Mr. Chachkes) Okay.
10:43:04 **8** A. **That's the only two I'm aware of that are**
10:43:06 **9 routinely doing it now.**
10:43:07 **10** Q. MAS has been testing talc for asbestos by
10:43:11 **11** TEM since 2017; is that correct?
10:43:14 **12** MR. CIRSCH: Object to form.
10:43:16 **13** THE WITNESS: We have been testing
10:43:17 **14** cosmetic talc since early 2017. We have tested
10:43:21 **15** industrial talc all the way back to the 1990s,
10:43:27 **16** early 2000s.
10:43:28 **17** Q. (By Mr. Chachkes) MAS has been testing
10:43:32 **18** talc for asbestos by PLM since about October of 2018;
10:43:36 **19** is that correct?
10:43:36 **20** MR. CIRSCH: Object to form.
10:43:41 **21** THE WITNESS: I don't know when we got
10:43:43 **22** started testing industrial talc for PLM.
10:43:46 **23** Probably way back in the 1990s, early 2000s.
10:43:51 **24** We've recently started analyzing cosmetic
10:43:56 **25** talc using the ISO 22262-1 and the Blount PLM
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10:44:05 **1** method enhanced, not your typical analysis. I
10:44:11 **2** don't know when we got started last year.
10:44:13 **3** Q. (By Mr. Chachkes) Okay. Is it possible
10:44:16 **4** you didn't start looking at cosmetic talc by PLM
10:44:19 **5** until October of 2018?
10:44:21 **6** MR. CIRSCH: Object to form.
10:44:23 **7** THE WITNESS: Well, unless I can go and
10:44:24 **8** look and verify, all I can say is I don't recall
10:44:26 **9** when we started analyzing cosmetic talc by PLM.
10:44:31 **10** Q. (By Mr. Chachkes) Have any academic
10:44:33 **11** institutions endorsed MAS as one of the best labs in
10:44:37 **12** the world to test talc?
10:44:39 **13** A. **If they have, they haven't let me know.**
10:44:41 **14** Q. Has MAS received any accolades from any
10:44:44 **15** academic institutions for its talc testing?
10:44:47 **16** A. **Not that I'm aware of.**
10:44:49 **17** Q. Have any nationally or internationally
10:44:51 **18** renowned TEM scientists identified MAS as one of the
10:44:55 **19** best labs in the world for testing talc?
10:44:58 **20** MR. CIRSCH: Object to form.
10:45:01 **21** THE WITNESS: I don't know who these
10:45:03 **22** internationally recognized experts are. We're
10:45:06 **23** just following a standard protocol to analyze
10:45:09 **24** talc using the most appropriate sensitivities
10:45:14 **25** for analytical sensitivities.
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10:45:16 **1** Q. (By Mr. Chachkes) So you're not aware of
10:45:17 **2** any TEM scientists who's not taking plaintiff
10:45:23 **3** lawyers' money who has recognized MAS as one of the
10:45:26 **4** best labs in the world for testing talc?
10:45:29 **5** MR. CIRSCH: Object to form.
10:45:31 **6** THE WITNESS: I don't recall any TEM
10:45:33 **7** analyst being paid by plaintiffs' attorneys or
10:45:37 **8** any TEM analyst paid by defense attorneys that
10:45:38 **9** are calling me and saying good job, Bill.
10:45:41 **10** Q. (By Mr. Chachkes) Have any nationally or
10:45:45 **11** internationally renowned PLM scientists identified
10:45:47 **12** MAS as one of the best labs in the world for testing
13 talc?
10:45:48 **14** MR. CIRSCH: Object to form.
10:45:50 **15** THE WITNESS: I don't know who these
10:45:52 **16** internationally renowned PLM labs are. I do
10:45:55 **17** believe we're -- because of how we've enhanced
10:45:59 **18** the PLM method that we are one of the better
10:46:04 **19** labs because of the time and effort we put into
10:46:06 **20** the analysis. Sort of along the lines of the
10:46:10 **21** proposed PLM method by the FDA in 1973, I think
10:46:14 **22** they said it was laborious.
10:46:16 **23** Q. (By Mr. Chachkes) All right. So this is
10:46:17 **24** not a question about what you believe or what people
10:46:19 **25** at MAS believe but a question about what third
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10:46:22 **1** parties believe.
10:46:23 **2** Are there any nationally or
10:46:25 **3** internationally renowned PLM scientists or any
10:46:27 **4** scientists, for that matter, who have identified MAS
10:46:30 **5** as one of the best labs in the world for testing talc
10:46:33 **6** under PLM?
10:46:34 **7** MR. CIRSCH: Object to form.
10:46:35 **8** THE WITNESS: I don't know.
10:46:35 **9** Q. (By Mr. Chachkes) Have you ever presented
10:46:37 **10** at any conferences about testing talc by TEM?
10:46:40 **11** A. **Maybe. Not cosmetic talcs, no.**
10:46:48 **12** Q. Okay. When you say maybe, nothing comes
10:46:51 **13** to mind?
10:46:51 **14** A. **Well, we have been analyzing industrial**
10:46:54 **15 talcs for some time. We have given talks at Johnson**
10:47:00 **16 Conferences in the past; Mr. Hatfield has. Any of**
10:47:01 **17 that data that may have happened, I just don't know.**
10:47:05 **18** Q. Okay. But for conferences that relate to
10:47:08 **19** testing talc with TEM, sitting here today, you can't
10:47:11 **20** recall presenting at any such conference?
10:47:15 **21** MR. CIRSCH: Object to form.
10:47:17 **22** THE WITNESS: I don't recall.
10:47:17 **23** Q. (By Mr. Chachkes) Have you ever presented
10:47:18 **24** at any conference -- sorry, strike that.
10:47:20 **25** Have you ever been invited to present at
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10:47:23 1 any conferences about testing talc with TEM or PLM?
10:47:26 2 A. **Yes, I was.**
10:47:27 3 Q. Okay. What was that?
10:47:28 4 A. **Bruce Bishop invited me to come debate**
10:47:34 5 **Dr. Sanchez at a DRI conference last year.**
10:47:37 6 Q. Okay. So did you actually go to that
10:47:38 7 conference?
10:47:38 8 A. **No.**
10:47:39 9 Q. And DRI conference, that's a defense bar
10:47:42 10 conference?
10:47:42 11 A. **Yes, sir. I have participated in those**
10:47:45 12 **for a number of times and typically debating one of**
10:47:49 13 **the defense experts. And he sent an email, and I**
10:47:56 14 **couldn't arrange it in my schedule.**
10:47:57 15 Q. The FDA had a conference in November '18
10:48:01 16 with Jeff San at the University of Maryland; are you
10:48:03 17 aware of that?
10:48:04 18 A. **I am.**
10:48:05 19 Q. Were you invited to participate?
10:48:06 20 A. **No.**
10:48:06 21 Q. Are you familiar with Forensic Analytical
10:48:10 22 Labs?
10:48:10 23 A. **I am.**
10:48:11 24 Q. Would you agree that they are an
10:48:13 25 independent laboratory?
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10:48:14 1 MR. CIRSCH: Object to form.
10:48:16 2 THE WITNESS: I don't know what their
10:48:17 3 background is.
10:48:19 4 Q. (By Mr. Chachkes) Okay. Have you relied
10:48:20 5 on their testing of talc for asbestos before?
10:48:24 6 A. **I don't know.**
10:48:25 7 Q. Sitting here today, is there any reason
10:48:29 8 why you believe you shouldn't be able to rely on
10:48:31 9 their work?
10:48:32 10 MR. CIRSCH: Object to form.
10:48:33 11 THE WITNESS: It depends on the work. I
10:48:35 12 would have to review what work that
10:48:37 13 hypothetically you want me to rely on.
10:48:38 14 Q. (By Mr. Chachkes) Yeah. So I'm just
10:48:40 15 talking about the laboratory, not necessarily the
10:48:42 16 nature of the science, which of course you'll always
10:48:46 17 review; right?
10:48:46 18 So the nature of the laboratory -- and
10:48:48 19 sitting here today, is there anything about the
10:48:50 20 Forensic Analytical Labs laboratory that makes you
10:48:54 21 suspicious of their work in any way?
10:48:56 22 A. **I don't have an opinion one way or the**
10:48:58 23 **other. Typically, for me to say something about any**
10:49:00 24 **particular lab, I would have to have some interaction**
10:49:04 25 **with that lab over the years.**
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10:49:07 1 Q. Now, you issued a supplemental report
10:49:10 2 January 15, 2019; correct?
10:49:12 3 A. **Yes, sir.**
10:49:12 4 Q. Why? What did it add to or subtract from
10:49:17 5 the first report?
10:49:18 6 A. **There was typos in the first report.**
10:49:21 7 **Also, we talked -- added somewhere, I believe, the**
10:49:25 8 **Blount PLM that we did on the -- or talked about it**
10:49:33 9 **on the 16 containers that Lee Poye tested.**
10:49:39 10 Q. And those errors that you just referred
10:49:43 11 to, when did you identify them? Was it after you
10:49:44 12 issued your January 15 report -- I'm sorry, after you
10:49:47 13 issued your November 14 report?
10:49:49 14 A. **Yes.**
10:49:49 15 Q. And how did you identify those errors?
10:49:53 16 A. **Reading through it. It was very obvious**
10:49:58 17 **to me that J3 was not P3, that I had missed it in a**
10:50:03 18 **couple of places.**
10:50:04 19 Q. Okay. So the errors that were identified
10:50:05 20 and fixed in the January 15 report, they were all
10:50:08 21 identified by you personally?
10:50:09 22 A. **Either myself or Dr. Rigler. I can't tell**
10:50:12 23 **you which one of us fixed the most.**
10:50:15 24 Q. Okay. And referring to these additional
10:50:19 25 data in the January 15 report, did that testing occur
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10:50:23 1 after November 14, 2018?
10:50:27 2 A. **Yes. I believe so.**
10:50:30 3 Q. And then there's a second supplemental
10:50:32 4 report dated February 1, 2019; correct?
10:50:35 5 A. **Correct.**
10:50:35 6 Q. Okay. And we discussed that before,
10:50:38 7 didn't we?
10:50:38 8 A. **Yes, sir.**
10:50:39 9 Q. Do you know why it was not produced until
10:50:47 10 February 2?
10:50:48 11 MR. CIRSCH: Object to form.
10:50:52 12 THE WITNESS: Why it wasn't produced until
10:50:54 13 February 2?
10:50:55 14 Q. (By Mr. Chachkes) Yeah.
10:50:55 15 A. **Because that's when I sent it.**
10:50:56 16 Q. Okay. You also produced two reports from
10:51:04 17 Lee Poye at J3 Resources dated December 12 and
10:51:09 18 December 21; correct?
10:51:10 19 A. **Correct.**
10:51:10 20 Q. Can you describe what those reports are?
10:51:11 21 A. **XRD of 17 MDL samples -- excuse me -- 19**
10:51:21 22 **MDL samples to finish off the MDL samples for XRD**
10:51:26 23 **that we were going to test. We didn't test the**
10:51:30 24 **Windsor railroad car samples for XRD.**
10:51:33 25 Q. And there's some PLM work in there as
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10:51:35 **1** well?

10:51:37 **2 A. I don't know.**

10:51:39 **3 Q.** That's okay. We can get back to that.

10:51:40 **4** Do these samples in Lee Poye's

10:51:47 **5** supplemental reports relate to -- do they correspond

10:51:53 **6** to samples in your report?

10:51:54 **7 A. Yes.**

10:51:54 **8 Q.** How did they -- how can somebody correlate

10:51:58 **9** the two?

10:51:59 **10 A. Let me see. There should have been a --**

10:52:12 **11 let me get some of this stuff out of the way.**

10:52:15 **12 Q.** Actually, you know, let's -- here. Let's

10:52:17 **13** go back to 10.

10:52:20 **14** Exhibit 10 is the December 12 letter

10:52:23 **15** from -- this is mine. You've got one in your stack.

10:52:25 **16 A. Oh, do I?**

10:52:26 **17 Q.** Yes.

10:52:27 **18 A. Okay.**

10:52:32 **19 Q.** Just the coding system, let's just take

10:52:34 **20** the first one. M69722-001, do you see on the front

10:52:40 **21** page?

10:52:40 **22 A. Yes.**

10:52:40 **23 Q.** Do you know what that refers to? Does

10:52:42 **24** that coding indicate something to you?

10:52:44 **25 A. It does. I didn't -- we don't have the**

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10:52:48 **1 key.**

10:52:48 **2 What I do is I make an additional number**

10:52:52 **3 so that the -- Lee Poye essentially gets blind**

10:52:58 **4 samples, and there's supposed to be a key produced**

10:53:00 **5 with that.**

10:53:01 **6 Q.** Okay. You have a key?

10:53:02 **7 A. I don't have it with me. I thought it was**

10:53:04 **8 attached to the report.**

10:53:05 **9** MR. CHACHKES: We ask the plaintiffs to

10:53:08 **10** produce that key. I don't think we got it.

10:53:11 **11** MS. O'DELL: Okay.

10:53:15 **12 Q.** (By Mr. Chachkes) Okay. So have you

10:53:19 **13** produced all the J3 -- all the data J3 Resources

10:53:24 **14** generated from the work for you in this case?

10:53:27 **15 A. Yes.**

10:53:27 **16 Q.** And did you ask them about what kind of

10:53:31 **17** materials they generated?

10:53:33 **18 A. I mean, other than what they sent me, no.**

10:53:38 **19 Q.** Okay. So you didn't ask them whether

10:53:39 **20** there was additional material that they generated but

10:53:42 **21** just did not provide to you?

10:53:44 **22 A. No, sir. I have dealt with and had XRD**

10:53:48 **23 done by them before in other reports, and this is**

10:53:51 **24 what they provide.**

10:53:52 **25 Q.** Has anyone at MAS discussed the production

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10:53:56 **1** request in this case with anybody at J3 Resources?

10:53:59 **2 A. No.**

10:53:59 **3 Q.** What measures do you employ to ensure that

10:54:02 **4** J3 Resources provides all the data it generated in

10:54:06 **5** its work for you?

10:54:07 **6** MR. CIRSCH: Object to form.

10:54:08 **7 Q.** (By Mr. Chachkes) Actually, strike that.

10:54:09 **8** I think we have already done that.

10:54:10 **9** All right. Your lab produced something

10:54:11 **10** called global particles tables for a number of

10:54:15 **11** samples. Does that ring a bell?

10:54:16 **12 A. Yes.**

10:54:16 **13 Q.** Okay. And what are those?

10:54:21 **14 A. That's the raw data for each of the**

10:54:24 **15 particles that were measured and counted.**

10:54:26 **16 Q.** Okay. And so that's the data underlying

10:54:30 **17** what you report in your expert reports?

10:54:33 **18** MR. CIRSCH: Object to form.

10:54:34 **19** THE WITNESS: Not in this expert report,

10:54:35 **20** I'm not relying on it, but in past ones, yes.

10:54:37 **21 Q.** (By Mr. Chachkes) Okay. Because those

10:54:38 **22** are non-MDL samples?

10:54:41 **23 A. Well, they're non-MDL samples. It's not**

10:54:44 **24 so much they're non-MDL samples, but I was under the**

10:54:48 **25 impression that these MDL samples weren't contested**

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10:54:51 **1 for chain of custody.**

10:54:52 **2 Q.** Okay. But what I'm asking, though, is the

10:54:55 **3** global particle tables that you produced in this case

10:54:58 **4** do not correspond to MDL samples; is that correct?

10:55:03 **5 A. That is correct.**

10:55:04 **6 Q.** Okay. Are you able to generate a global

10:55:07 **7** particle table for the MDL samples?

10:55:10 **8 A. We have not analyzed any MDL samples yet**

10:55:13 **9 that I'm aware of.**

10:55:13 **10 Q.** What about the samples in your reports in

10:55:16 **11** this case?

10:55:16 **12 A. Well, they're not particle size analysis.**

10:55:20 **13 They're PLM and TEM analysis. Those are specifically**

10:55:25 **14 designed for detection of amphibole asbestos, not**

10:55:31 **15 particle sizing.**

10:55:32 **16 Q.** Why did you produce the global particle

10:55:34 **17** tables in this case?

10:55:35 **18** MR. CIRSCH: Object to form.

10:55:36 **19** THE WITNESS: I was asked for it, you

10:55:39 **20** know, in other cases, so I thought I would just

10:55:41 **21** produce it here, even though I'm not relying on

10:55:43 **22** it.

10:55:46 **23 Q.** (By Mr. Chachkes) Okay. Do you do talc

10:55:52 **24** particle size analysis for the MDL?

10:55:54 **25 A. We did not.**

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10:55:55 **1** Q. All right. But the data in the global
 10:56:07 **2** particle tables relates to talc particle size?
 10:56:12 **3** A. **Yes, sir. All the particles for the talc**
 10:56:15 **4 sizes that -- in the -- I guess it was in August 4,**
 10:56:22 **5 2017, or 2018 report, I can't remember.**
 10:56:24 **6** Q. Sitting here today, are you aware of any
 10:56:27 **7** relevance that the global particle tables that you
 10:56:30 **8** produced have to the reports you issued in this case,
 10:56:33 **9** the MDL?
 10:56:35 **10** MR. CIRSCH: Object to form.
 10:56:36 **11** THE WITNESS: Again, as I'm stating, I'm
 10:56:38 **12** not relying on it. We did not do any MDL
 10:56:40 **13** particle sizing. May in the future, but we
 10:56:44 **14** haven't done it here, and I'm not relying on the
 10:56:46 **15** report that we issued --
 10:56:47 **16** Q. (By Mr. Chachkes) Okay.
 10:56:49 **17** A. **-- in August.**
 10:56:50 **18** Q. Did your analyst compare any of the
 10:56:52 **19** particles identified in your MDL report by PLM to
 10:56:59 **20** compare them with a known asbestos reference sample?
 10:57:03 **21** MR. CIRSCH: Object to form.
 10:57:14 **22** THE WITNESS: I don't know. It's not
 10:57:16 **23** something that we typically require analysts to
 10:57:19 **24** do, especially the analyst doing this. He's
 10:57:23 **25** worked for us for almost 30 years; he's a
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 10:57:26 **1** professional geologist; he's probably analyzed
 10:57:30 **2** tens and tens and tens of thousands of samples.
 10:57:33 **3** He does compare to the appropriate
 10:57:38 **4** information --
 10:57:43 **5** MR. CIRSCH: Let him finish.
 10:57:45 **6** Q. (By Mr. Chachkes) Yeah.
 10:57:46 **7** A. **So did he pull out standard anthophyllite**
 10:57:47 **8 tremolite? I would have to check.**
 10:57:48 **9** Q. So when you say compared to the
 10:57:50 **10** appropriate information, you have no knowledge of
 10:57:52 **11** what that appropriate information is, do you?
 10:57:54 **12** A. **Sure I do.**
 10:57:54 **13** MR. CIRSCH: Object to form.
 10:57:56 **14** THE WITNESS: The refractive indices, the
 10:58:01 **15** measurement of -- indices, the angle of
 10:58:02 **16** extinction, either oblique or parallel, depend
 10:58:05 **17** on cross polars, the dispersion staining on the
 10:58:08 **18** colors using the Su charts to determine the
 10:58:13 **19** refractive indices, the sign of elongation, or
 10:58:13 **20** the speed.
 10:58:13 **21** Q. (By Mr. Chachkes) So all these --
 10:58:14 **22** A. **All the standard mineralogical information**
 10:58:16 **23 that a well-seasoned PLM analyst would do.**
 10:58:20 **24** Q. So I'm not talking about the data that he
 10:58:23 **25** pulls from looking at samples. I'm talking about
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10:58:26 **1** comparing to a reference sample from some source
 10:58:30 **2** other than something generated by MAS, are you aware
 10:58:33 **3** of any of that?
 10:58:34 **4** MR. CIRSCH: Object to form.
 10:58:36 **5** THE WITNESS: They have all the references
 10:58:38 **6** for all the NIST standards that are routinely
 10:58:41 **7** looked at when we get -- when our lab is audited
 10:58:47 **8** by the NVLAP, they go around and make sure the
 10:58:51 **9** analysts can identify these types of materials.
 10:58:53 **10** So, yes, we have reference materials. You
 10:58:56 **11** know, did they pull it out or not, as I'm
 10:58:59 **12** sitting right here specifically, but they do do
 10:59:01 **13** that periodically. So that's all I can tell
 10:59:05 **14** you.
 10:59:05 **15** Q. (By Mr. Chachkes) Okay. So you have NIST
 10:59:07 **16** samples, but you don't know whether your PLM
 10:59:09 **17** scientist actually compared the PLM work he did in
 10:59:13 **18** this case to those NIST samples for this case?
 10:59:18 **19** A. **Specifically for these MDL samples did he**
 10:59:23 **20 pull out the standards or just use the standard**
 10:59:27 **21 crystallographic information that's specific for the**
 10:59:31 **22 identification of these types of amphiboles, I'd have**
 10:59:35 **23 to check.**
 10:59:36 **24** Q. Okay. So I was asking about the NIST
 10:59:38 **25** standard, and you threw in something else. I just
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 10:59:41 **1** want to focus on the NIST standard.
 10:59:43 **2** Sitting here today you're not aware that
 10:59:44 **3** your PLM scientist compared his results on the PLM
 10:59:47 **4** for the samples in this case directly to the NIST
 10:59:52 **5** sample -- NIST standards; correct?
 10:59:55 **6** MR. CIRSCH: Object to form.
 10:59:56 **7** THE WITNESS: It's not being aware or not
 10:59:57 **8** aware. It's just a question that I can clear up
 11:00:01 **9** and ask.
 11:00:02 **10** Q. (By Mr. Chachkes) Okay. Did you ask him
 11:00:05 **11** at any point?
 11:00:07 **12** A. **No. I typically don't ask 30-year**
 11:00:12 **13 seasoned analysts/geologists on any particular**
 11:00:15 **14 project. But now that you've asked the question,**
 11:00:18 **15 I'll ask.**
 11:00:18 **16** Q. Okay. And so you have one analyst doing
 11:00:24 **17** all your PLM work for the MDL samples?
 11:00:25 **18** A. **Yes.**
 11:00:26 **19** Q. What's his name or her name?
 11:00:27 **20** A. **Paul Hess.**
 11:00:29 **21** Q. Spell the last name, please.
 11:00:31 **22** A. **H-e-s-s.**
 11:00:32 **23** Q. Your report doesn't state that there were
 11:00:38 **24** asbestos reference samples used in the PLM analysis;
 11:00:38 **25** correct?
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11:00:43 **1 A. No, sir. It's not the type of information**
 11:00:45 **2 I would typically put in a report.**
 11:00:47 **3 Q.** Do you know which set of NIST standards
 11:00:53 **4** exist at MAS right now?
 11:00:56 **5 A. It is the 1875, I think it is. I have to**
 11:01:02 **6 check the numbers on it. It's the standard NIST**
 11:01:05 **7 samples that all asbestos labs have or should have.**
 11:01:09 **8 Q.** Do you know when you obtained them?
 11:01:11 **9 A. Not as I sit here today.**
 11:01:13 **10 Q.** Did your analyst compare any of the
 11:01:15 **11** particles identified in this report by TEM with any
 11:01:19 **12** known asbestos reference samples?
 11:01:21 **13 A. Well, we have analyzed both reference**
 11:01:30 **14 tremolite series, anthophyllite series. We have all**
 11:01:33 **15 those reference standards, analytical data on the TEM**
 11:01:39 **16 walls. I don't think they pulled the reference and**
 11:01:43 **17 put them in each and every time, but they routinely**
 11:01:47 **18 check reference samples.**
 11:01:49 **19 Q.** Okay. So when you say they check
 11:01:51 **20** reference samples, are you saying you mean that they
 11:01:53 **21** check to whatever's on your reference wall?
 11:01:56 **22** MR. CIRSCH: Object to form.
 11:01:57 **23** THE WITNESS: Well, no. The reference
 11:01:58 **24** wall is from the reference samples, and we have
 11:02:01 **25** analyzed reference samples in the past
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11:02:03 **1** specifically for these J&J cases. And the
 11:02:08 **2** analysts are well trained.
 11:02:10 **3** I don't know how often they need to pull
 11:02:12 **4** out a reference sample in order to identify
 11:02:14 **5** either the anthophyllite solid solution series
 11:02:17 **6** or the tremolite solid solution series.
 11:02:21 **7 Q.** (By Mr. Chachkes) Let's ask two different
 11:02:23 **8** lines of questions here.
 11:02:24 **9** So you have internal MAS-generated
 11:02:27 **10** reference samples for TEM to identify asbestos; is
 11:02:30 **11** that correct?
 11:02:30 **12 A. Yes.**
 11:02:31 **13 Q.** Okay. Did you produce them?
 11:02:34 **14** MR. CIRSCH: Object to form.
 11:02:35 **15** THE WITNESS: I didn't think it was asked.
 11:02:37 **16** MR. CHACHKES: Okay. I would ask the
 11:02:38 **17** plaintiffs produce that, please.
 11:02:40 **18 Q.** (By Mr. Chachkes) What about reference
 11:02:42 **19** samples generated by third parties, do you have
 11:02:47 **20** those?
 11:02:49 **21 A. Reference samples by third parties, you**
 11:02:51 **22 will have to -- NIST is a third party.**
 11:02:53 **23 Q.** Okay. So anything else?
 11:02:58 **24 A. We have accumulated reference samples now**
 11:03:01 **25 from anthophyllite asbestos from Windsor County, and**
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11:03:09 **1 I'd have to look at them and see what the validation**
 11:03:13 **2 is. We have cummingtonite standards now. We have**
 11:03:17 **3 grunerite standards. We have -- I believe we have**
 11:03:21 **4 winchite and richterite standards. We have not**
 11:03:25 **5 analyzed them yet to the degree where we can put the**
 11:03:28 **6 results altogether.**
 11:03:28 **7 Q.** So are these -- so I'm talking about
 11:03:31 **8** reference standards that you can look at those and
 11:03:35 **9** compare to what you're generating in this case. So
 11:03:39 **10** you're saying that there are third-party
 11:03:41 **11** anthophyllite standards that you have that were
 11:03:45 **12** produced by something in Windsor County?
 11:03:48 **13** MR. CIRSCH: Object to form.
 11:03:49 **14** THE WITNESS: It wasn't produced by
 11:03:50 **15** Windsor County. It was a mineral house that
 11:03:57 **16** sells them. And I have not had an opportunity
 11:04:01 **17** to -- we haven't had an opportunity to look at
 11:04:03 **18** them yet.
 11:04:03 **19 Q.** (By Mr. Chachkes) That's just the
 11:04:05 **20** mineral, though, right, the raw mineral?
 11:04:07 **21** MR. CIRSCH: Object to form.
 11:04:08 **22** THE WITNESS: Well, it's fibrous, it's raw
 11:04:11 **23** mineral anthophyllite, raw mineral
 11:04:15 **24** cummingtonite, raw mineral grunerite, raw
 11:04:18 **25** mineral winchite-richterite.
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11:04:22 **1 Q.** (By Mr. Chachkes) Okay. For those
 11:04:22 **2** minerals that you just mentioned, did you obtain from
 11:04:24 **3** a third party a TEM photo of the mineral at issue
 11:04:31 **4** that you can use as a standard to compare what you
 11:04:34 **5** find under your TEM?
 11:04:36 **6** MR. CIRSCH: Object to form.
 11:04:38 **7** THE WITNESS: No. Typically people don't
 11:04:39 **8** provide that -- or NIST should have -- a TEM lab
 11:04:43 **9** that's looking at standards should have the
 11:04:46 **10** qualifications and training to be able to
 11:04:49 **11** recognize the regulated asbestos types.
 11:04:52 **12 Q.** (By Mr. Chachkes) Okay. So, now, the
 11:04:54 **13** only third-party TEM photographs that you could use
 11:04:59 **14** as a standard for determining whether what you're
 11:05:03 **15** looking at under your TEM is asbestos, the only one
 11:05:06 **16** you've mentioned so far is NIST; correct?
 11:05:09 **17 A. I'm sorry, I misunderstood.**
 11:05:10 **18 NIST does not provide you TEM pictures or**
 11:05:12 **19 EDS pictures or PLM pictures or any XRD pictures.**
 11:05:16 **20 They assume you have the training and capability of**
 11:05:19 **21 doing that.**
 11:05:19 **22 I'm not aware of any third-party group**
 11:05:21 **23 providing photograph standards along with the**
 11:05:25 **24 samples.**
 11:05:25 **25 Q.** Okay. So to sum it all up, you do not
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11:05:27 **1** have any third-party TEM photos that you use as
11:05:33 **2** standards to compare to what you're seeing under the
11:05:35 **3** TEM?
11:05:36 **4** MR. CIRSCH: Object to form.
11:05:37 **5** THE WITNESS: That's correct. No third
11:05:38 **6** party has sent us TEMs along with their
11:05:41 **7** standards and say here's a standard with a TEM
11:05:44 **8** photo and this is what it all looks like.
11:05:46 **9** **Q.** (By Mr. Chachkes) Your report also does
11:05:47 **10** not state that the analyst used asbestos reference
11:05:52 **11** standards in their TEM analysis; correct?
11:05:55 **12** **A.** **That is correct. None of our reports do.**
11:05:57 **13** **Q.** How does your lab distribute samples to
11:05:59 **14** individual analysts to test? Is it random? Is it
11:06:02 **15** like some analysts get a certain kind of sample?
11:06:05 **16** **A.** **It's random.**
11:06:06 **17** **Q.** Is that the same for J3? Did you give
11:06:08 **18** them random samples?
11:06:11 **19** MR. CIRSCH: Object to form.
11:06:13 **20** THE WITNESS: Random samples. For J3 I
11:06:15 **21** specifically gave them the samples that we
11:06:17 **22** wanted XRD done on them.
11:06:18 **23** **Q.** (By Mr. Chachkes) Okay. But for your
11:06:23 **24** individual analyst, nobody's getting like more
11:06:25 **25** Vermont and someone's getting more China, that kind
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11:06:29 **1** of thing?
11:06:29 **2** **A.** **Not that I'm aware of.**
11:06:30 **3** **Q.** You didn't give any particular analyst
11:06:32 **4** like you're getting more bottles from the '50s and
11:06:36 **5** '60s and someone else is getting something more from
11:06:38 **6** a later era, that's not happening?
11:06:40 **7** **A.** **It's fairly random. The analysts don't**
11:06:43 **8** **have any knowledge of anything more than the sample**
11:06:47 **9** **number. They don't know if it's China or Vermont**
11:06:51 **10** **or -- we're not telling them anything other than they**
11:06:54 **11** **just get a sample number.**
11:06:55 **12** **Q.** Who decides which analyst gets which
11:06:58 **13** bottles?
11:06:58 **14** **A.** **That's a good question. I guess Victoria**
11:07:08 **15** **Panariello does.**
11:07:08 **16** **Q.** Who is she?
11:07:09 **17** **A.** **She is the head person in our TEM lab.**
11:07:14 **18** **Q.** Head person meaning administrative?
11:07:18 **19** Scientist?
11:07:18 **20** **A.** **She's a scientist.**
11:07:19 **21** **Q.** Does she do any analysis herself?
11:07:21 **22** **A.** **Occasionally.**
11:07:22 **23** **Q.** Under what instrument?
11:07:23 **24** **A.** **She's -- she can do both polarized light**
11:07:28 **25** **microscopy as well as transmission electron**

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11:07:30 **1** **microscopy.**
11:07:30 **2** **Q.** Would you expect two analysts from your
11:07:34 **3** laboratory, given splits from the same bottle, to
11:07:38 **4** identify the same asbestos concentration?
11:07:40 **5** **A.** **You'll never get an exact asbestos**
11:07:50 **6** **concentration depending on what level of accessory**
11:07:57 **7** **amphibole asbestos is in the sample, but I would not**
11:08:00 **8** **expect the exact same.**
11:08:01 **9** **Q.** What level of variation would you think is
11:08:05 **10** so great that you would conclude something went
11:08:08 **11** wrong?
11:08:10 **12** **A.** **Don't know. I've not seen that variation**
11:08:12 **13** **yet for two different samples of the same bottle**
11:08:15 **14** **that's been analyzed.**
11:08:16 **15** **Q.** Okay. Hypothetically, if you split a
11:08:19 **16** bottle and one analyst found no detectable asbestos
11:08:22 **17** and another found half a percent by concentration
11:08:27 **18** asbestos, would you think that was within a
11:08:30 **19** reasonable margin of error?
11:08:33 **20** MR. CIRSCH: Object to form.
11:08:34 **21** THE WITNESS: By TEM?
11:08:35 **22** **Q.** (By Mr. Chachkes) Sure, by TEM.
11:08:37 **23** **A.** **At a half a percent?**
11:08:39 **24** **Q.** Yeah.
11:08:39 **25** **A.** **No, that's not acceptable.**

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11:08:41 **1** **Q.** Okay. What about one analyst finding no
11:08:46 **2** detectable asbestos, another finding a quarter of a
11:08:50 **3** percent?
11:08:50 **4** MR. CIRSCH: Object to form.
11:08:51 **5** **Q.** (By Mr. Chachkes) Is that an acceptable
11:08:52 **6** margin of error?
11:08:53 **7** **A.** **.25 percent by weight? A quarter percent?**
11:08:59 **8** **Q.** No, no. A quarter of a percent.
11:09:02 **9** MR. CIRSCH: Object to form.
11:09:03 **10** THE WITNESS: Isn't that .25? Isn't that
11:09:05 **11** a quarter of a percent?
11:09:09 **12** **Q.** (By Mr. Chachkes) Yeah.
11:09:09 **13** **A.** **Sometimes simple math gets the better of**
11:09:13 **14** **me.**
11:09:14 **15** **I would think that would be unacceptable;**
11:09:16 **16** **something has gone wrong.**
11:09:18 **17** **Q.** Just to spare me from the trouble of doing
11:09:20 **18** this all day, at what point would you say, you know,
11:09:23 **19** that's acceptable, and maybe a little larger wouldn't
11:09:26 **20** be acceptable?
11:09:26 **21** MR. CIRSCH: Object to form.
11:09:27 **22** THE WITNESS: I'd have to look at every
11:09:29 **23** situation to see what that percentage is before
11:09:31 **24** I could say what is acceptable and not
11:09:34 **25** acceptable.

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11:09:35 **1** Q. (By Mr. Chachkes) Okay. You have no
11:09:39 **2** written or decided standard in your laboratory for
11:09:42 **3** what kind of error between two analysts is acceptable
11:09:45 **4** or not acceptable, do you?
11:09:47 **5** MR. CIRSCH: Object to form.
11:09:48 **6** THE WITNESS: Yeah, we do. We have
11:09:49 **7** measured where they have gone in and analyzed
11:09:52 **8** the same sample. See, when you were asking for
11:09:53 **9** what's acceptable and not acceptable, it's not
11:09:56 **10** so much on the analyst's side. It could be the
11:09:58 **11** preparation side. It could be a number of
11:10:01 **12** things.
11:10:02 **13** So we have done error rates for the
11:10:06 **14** analyst by TEM analysis where they go in and we
11:10:10 **15** know that in these many grid openings there's
11:10:12 **16** this many fibers, and then we can have them
11:10:15 **17** analyze the same grid openings.
11:10:17 **18** You're taking out the part about the
11:10:19 **19** sample preparation, the filter preparation. So
11:10:22 **20** you have to look at it individually. But for
11:10:24 **21** error rates for the analyst, we have that.
11:10:27 **22** Q. (By Mr. Chachkes) Okay. But just
11:10:29 **23** comparing -- just visually comparing a grid, a single
11:10:32 **24** grid; correct?
11:10:33 **25** MR. CIRSCH: Object to form.
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11:10:35 **1** THE WITNESS: Grid openings --
11:10:35 **2** Q. (By Mr. Chachkes) Yeah.
11:10:36 **3** A. -- **where each analyst is told to count the**
11:10:39 **4 same grid opening and, therefore, you can determine**
11:10:43 **5 what the analyst -- what the coefficient of variation**
11:10:48 **6 is.**
11:10:49 **7 If you have a sample where -- you take two**
11:10:52 **8 samples and one sample is -- they found one fiber in**
11:10:54 **9 a hundred grid openings and another sample they found**
11:10:57 **10 zero, that's within the -- that's within the margin**
11:11:00 **11 of error. That's acceptable.**
11:11:02 **12 If you have a sample where one analyst**
11:11:04 **13 found 50 fibers and one analyst found none or one,**
11:11:10 **14 then something has happened, and you have to go back**
11:11:12 **15 and look and go, okay, are the grid openings you**
11:11:14 **16 looked at he looked at in the first one. So there is**
11:11:17 **17 a process that we have to evaluate all data where we**
11:11:22 **18 have multiple samples of the same container.**
11:11:24 **19** Q. Sample preparation is extremely important
11:11:27 **20** because that affects the --
21 (Cell phone rings.)
22 Q. (By Mr. Chachkes) Okay. Sample
23 preparation is extremely important because that
11:11:50 **24** affects the outcomes; correct?
11:11:53 **25** MR. CIRSCH: Object to form.
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11:11:54 **1** THE WITNESS: All sample preparation is
11:11:55 **2** important.
11:11:55 **3** Q. (By Mr. Chachkes) And do all your
11:11:56 **4** analysts use the same sample preparation methods?
11:12:01 **5** A. **All the people who -- the folks who**
11:12:06 **6 prepare the samples use the method that is**
11:12:10 **7 appropriate for the analysis that's going to be done.**
11:12:13 **8** Q. If there is -- for all the samples that
11:12:18 **9** were analyzed in your report, were they prepared --
11:12:22 **10** the sample preparation, were they all done by the
11:12:25 **11** same method?
11:12:26 **12** A. **Yes.**
11:12:26 **13** Q. Were they all done by the same person?
11:12:28 **14** A. **I would have to look. But yes. Most**
11:12:31 **15 likely these samples were all done by the same**
11:12:34 **16 person.**
11:12:34 **17** Q. Okay. If you took a split from a single
11:12:41 **18** bottle and you had two analysts look at it, would you
11:12:44 **19** expect them to identify the same kinds of asbestos,
11:12:47 **20** assuming there was asbestos spotted?
11:12:49 **21** MR. CIRSCH: Object to form.
11:12:52 **22** THE WITNESS: Not necessarily, no.
11:12:53 **23** Q. (By Mr. Chachkes) Okay. So one could say
11:12:54 **24** I see tremolite and another could say I see
11:12:57 **25** anthophyllite and you don't think that is -- that
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11:13:01 **1** demonstrates a problem?
11:13:03 **2** MR. CIRSCH: Object to form.
11:13:04 **3** THE WITNESS: If the chemistry is right,
11:13:08 **4** the -- and they have identified it correctly,
11:13:11 **5** no. Many of these samples have two types of
11:13:16 **6** asbestos in it.
11:13:16 **7** Q. (By Mr. Chachkes) Okay. Is there any
11:13:22 **8** situation where you think an analyst has identified
11:13:26 **9** an asbestos that you believe maybe there's an error
11:13:30 **10** there?
11:13:32 **11** MR. CIRSCH: Object to form.
11:13:33 **12** THE WITNESS: I haven't run across
11:13:34 **13** anything like that, no.
11:13:35 **14** Q. (By Mr. Chachkes) And if one -- if there
11:13:36 **15** was a split and one analyst said I found -- let's say
11:13:39 **16** there was a split three ways, and one of your
11:13:42 **17** analysts said I found anthophyllite, another analyst
11:13:45 **18** said I found tremolite, and a third analyst said I
11:13:49 **19** found nothing detectable, you would not say maybe
11:13:52 **20** there's a problem here?
11:13:53 **21** MR. CIRSCH: Object to form.
11:13:54 **22** THE WITNESS: Unless I could review the
11:13:55 **23** data and -- you know, it's an interesting
11:13:56 **24** hypothetical. I don't think we have run across
11:13:58 **25** that interesting hypothetical.
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11:13:59 **1** But I would have to review the data to see
 11:14:02 **2** what they're analyzing, what the chemistry is,
 11:14:05 **3** how did they identify, and how many asbestos
 11:14:09 **4** fibers the two that found it versus the one that
 11:14:12 **5** didn't. So it's --
 11:14:14 **6** Q. (By Mr. Chachkes) Okay.
 11:14:14 **7** A. -- **you just can't say is this a problem,**
 11:14:18 **8 this -- maybe, maybe not.**
 11:14:20 **9** Q. Okay. So there is a situation you would
 11:14:22 **10** say there is not a problem where three analysts
 11:14:25 **11** looking at the same bottle finding -- one found
 11:14:29 **12** anthophyllite, one found tremolite, one found nothing
 11:14:31 **13** detectable, there is a situation where that would not
 11:14:33 **14** be a problem, you can imagine that?
 11:14:35 **15** MR. CIRSCH: Object to form.
 11:14:35 **16** THE WITNESS: I don't know if I can
 11:14:37 **17** imagine any of this happening, but it's your
 11:14:40 **18** hypothetical. Unless I can look at the data and
 11:14:44 **19** understand what each of the analysts were
 11:14:46 **20** counting, how many structures, what is the
 11:14:48 **21** chemistry, what is the diffraction patterns, is
 11:14:51 **22** it the two analysts found one and one found
 11:14:54 **23** zero, is this -- you know, what is the mine this
 11:14:58 **24** is coming from, how does our other data look --
 11:15:01 **25** there's a lot involved there than just saying

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11:15:03 **1** off the cuff, oh, that's a problem or that's not
 11:15:05 **2** a problem.
 11:15:06 **3** Q. (By Mr. Chachkes) Okay. All right. I've
 11:15:08 **4** asked you whether you can imagine a situation where
 11:15:11 **5** that's not a problem. You have not provided that to
 11:15:13 **6** me. This is -- I'll just ask it one more time. Can
 11:15:16 **7** you provide that to me? I can imagine that's not a
 11:15:18 **8** problem.
 11:15:18 **9** MR. CIRSCH: Object to form. I think he
 11:15:20 **10** answered your question.
 11:15:21 **11** THE WITNESS: I can't give you any
 11:15:22 **12** additional information about that because I
 11:15:25 **13** don't -- as a scientist I just don't like to
 11:15:27 **14** say, well, this is -- I can imagine a problem
 11:15:30 **15** here, I can't imagine it's a problem, without
 11:15:32 **16** looking at any data to see how many asbestos
 11:15:34 **17** fibers each of the analysts counted, is it one,
 11:15:37 **18** is it ten, is it five, what's the chemistry look
 11:15:40 **19** like, the EDXA, the SAED. I would have to
 11:15:47 **20** review it to see if it's a problem or not.
 11:15:49 **21** Q. (By Mr. Chachkes) Is there sufficient
 11:15:50 **22** subjectivity in the system such that it could be
 11:15:52 **23** correct that one analyst could find in a bottle
 11:15:55 **24** tremolite and another analyst could find in the
 11:15:57 **25** bottle anthophyllite?

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11:15:58 **1** MR. CIRSCH: Object to form.
 11:16:00 **2** THE WITNESS: I don't think it's
 11:16:01 **3** subjectivity. I just think it's wherever the
 11:16:05 **4** cosmetic talc source was in any particular mine,
 11:16:09 **5** what's there. We have many samples that have
 11:16:12 **6** both types of asbestos in it.
 11:16:14 **7** So you can't say, well, you found this and
 11:16:18 **8** the other one found that, when the source, the
 11:16:21 **9** accessory -- amphibole asbestos accessory
 11:16:23 **10** mineral in these mines have both types.
 11:16:26 **11** Q. (By Mr. Chachkes) If one of your
 11:16:27 **12** scientists looked at a J&J bottle of talc and found a
 11:16:32 **13** particular concentration of a particular kind of
 11:16:36 **14** asbestos, would you -- do you believe to within a
 11:16:42 **15** scientific -- a degree of scientific -- reasonable
 11:16:45 **16** scientific degree of certainty that a second
 11:16:50 **17** scientist following proper procedures would find the
 11:16:52 **18** same?
 11:16:52 **19** MR. CIRSCH: Object to form.
 11:16:53 **20** THE WITNESS: I think we already talked
 11:16:54 **21** about this. I would never expect a second
 11:16:56 **22** scientist or a second analyst going in with a
 11:16:59 **23** separate prep sample finding the exact amount.
 11:17:00 **24** And again, it depends on how many is there.
 11:17:03 **25** We did discuss this once. If it's one or

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11:17:05 **1** two and the second analyst found none, that's in
 11:17:08 **2** the margin of error, or it's looking for the
 11:17:12 **3** needle in the haystack sort of analogy.
 11:17:15 **4** If one analyst found 50 and the other
 11:17:18 **5** found zero, yes, that's a problem, like we
 11:17:19 **6** already discussed. Again, I would have to look
 11:17:21 **7** at the data to determine if it's a problem or
 11:17:23 **8** not.
 11:17:24 **9** Q. (By Mr. Chachkes) Do you believe it's
 11:17:26 **10** appropriate, given this margin of error, to run
 11:17:30 **11** multiple tests on a single bottle and then average
 11:17:33 **12** the results to get what would be the correct answer?
 11:17:37 **13** MR. CIRSCH: Object to form.
 11:17:38 **14** THE WITNESS: I don't think that's
 11:17:39 **15** necessary. I think the -- we can accept what
 11:17:42 **16** the analysis is. It comes from a sample in a
 11:17:45 **17** bottle. The more you run, you may go from
 11:17:50 **18** nondetect initially to detect in the second or
 11:17:54 **19** third. But I don't think that is necessary to
 11:17:56 **20** do for the types of analysis we're doing.
 11:17:59 **21** Q. (By Mr. Chachkes) For two of your
 11:18:02 **22** analysts analyzing the same bottle, what degree of
 11:18:06 **23** difference in the detected percentage of fibers
 11:18:10 **24** versus detected percentage of bundles would you
 11:18:17 **25** expect normally?

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11:18:19 1 MR. CIRSCH: Object to form.
 11:18:20 2 THE WITNESS: I don't have any
 11:18:21 3 expectations. The analyst is ultimately making
 11:18:24 4 the decision if it is a single fiber or a
 11:18:28 5 bundle. Because he's looking in the microscope,
 11:18:31 6 he's the one who can -- you're looking through
 11:18:34 7 the fiber, he's the one doing the -- he can
 11:18:38 8 change the focal plane, he can change from dark
 11:18:42 9 field to bright field, so ultimately he's making
 11:18:44 10 the decision on it.
 11:18:46 11 Q. (By Mr. Chachkes) I am asking really what
 11:18:49 12 is the margin of error in detecting fiber versus
 11:18:53 13 bundle percentage, acceptable margin of error. Have
 11:18:57 14 you ever figured that out?
 11:18:58 15 A. We haven't done that; it's really not
 11:19:00 16 necessary. It's more important for coefficients of
 11:19:04 17 variation. I've reviewed all the photographs of
 11:19:07 18 fibers and bundles. I would say 95, 98 percent of
 11:19:14 19 them I agree with. There's a couple percent in there
 11:19:18 20 that you have to leave it up to the analyst to make
 11:19:21 21 that decision.
 11:19:22 22 Q. Would you expect an analyst in your lab
 11:19:25 23 and an analyst in Lee Poye's lab to get the same
 11:19:29 24 results for a particular bottle? Is it the same
 11:19:32 25 answer as I've been getting with two analysts in your
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11:19:34 1 lab?
 11:19:34 2 MR. CIRSCH: Object to form.
 11:19:36 3 THE WITNESS: Yes. I would expect,
 11:19:38 4 depending on what the count is or how many
 11:19:41 5 fibers, if it's not in the margin of error, that
 11:19:44 6 we would verify that it's same bottle as
 11:19:47 7 positive. But other than that, I would have to
 11:19:51 8 see the data to see.
 11:19:52 9 Q. (By Mr. Chachkes) When you say -- when
 11:19:55 10 you say it's not within the margin of error, what's
 11:19:58 11 the quantification of that margin of error?
 11:20:00 12 A. I think our analysts have a margin of
 11:20:02 13 error on coefficient of variation somewhere in the 6
 11:20:03 14 to 7 percent range. So one lab finding one fiber or
 11:20:07 15 maybe two fibers, another lab finding zero or finding
 11:20:10 16 four, I don't have any issue with that.
 11:20:14 17 Q. Would you expect the samples, the various
 11:20:23 18 bottles from a single mine, like all the bottles from
 11:20:26 19 J&J talc from Vermont, cosmetic talc from the Vermont
 11:20:31 20 mine, to have roughly the same EDS spectra?
 11:20:36 21 MR. CIRSCH: Object to form.
 11:20:38 22 THE WITNESS: Depending on the type of
 11:20:39 23 asbestos, yes.
 11:20:39 24 Q. (By Mr. Chachkes) Okay. By the way, I've
 11:20:43 25 seen EDXA; I've seen EDS. Do you use those
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11:20:48 1 synonymously in your report?
 11:20:50 2 A. I think all ours say EDXA. EDS is old
 11:20:54 3 school. They're both the same technique: energy
 11:20:56 4 dispersive spectroscopy or energy dispersive x-ray
 11:21:00 5 spectroscopy.
 11:21:00 6 Q. Do you expect all the samples from a
 11:21:01 7 single mine, for example, the cosmetic talc from
 11:21:08 8 J&J's Vermont mine, to have similar SAED patterns?
 11:21:15 9 A. Depending on the orientation of the
 11:21:18 10 crystal and depending on what the material is.
 11:21:22 11 Tremolite, winchite, richterite,
 11:21:27 12 actinolite typically have similar, but the
 11:21:30 13 anthophyllite solid solution series, especially from
 11:21:34 14 Vermont where you can have no iron, iron-rich,
 11:21:38 15 cummingtonite, high-iron cummingtonite, and actually
 11:21:43 16 going to grunerite, those will have different
 11:21:46 17 reflections because you're going from orthorhombic to
 11:21:49 18 monoclinic.
 11:21:50 19 Q. So would you expect all the samples from a
 11:21:53 20 single mine to have the same concentration of
 11:21:57 21 asbestos?
 11:21:58 22 A. No.
 11:21:59 23 Q. Why not?
 11:22:00 24 A. Because you're dealing with accessory
 11:22:02 25 minerals. It just depends on where it's being dug
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11:22:07 1 out of the mine.
 11:22:07 2 Q. Would you expect all the samples from a
 11:22:10 3 single mine to have the same fiber versus bundle
 11:22:14 4 ratio?
 11:22:15 5 A. Not necessarily. All these materials are
 11:22:18 6 milled, and you're dealing with an asbestos type
 11:22:21 7 tremolite-anthophyllite that's brittle. So I don't
 11:22:26 8 know if I would expect to see the same bundles to
 11:22:30 9 fibers.
 11:22:30 10 And of course you're also dealing with the
 11:22:33 11 microscopist who has to make that final decision, the
 11:22:36 12 TEM microscopist, if it's a single fiber or bundle.
 11:22:40 13 What we try to make sure happens is that
 11:22:44 14 every asbestos fiber or bundle we identify meets the
 11:22:49 15 counting criteria for a regulated asbestos fiber or
 11:22:53 16 bundle as per the TEM methods, both ISO, ASTM.
 11:22:59 17 That's the most important thing.
 11:23:01 18 And then we try to also get some
 11:23:03 19 consistency on whether it's bundles or fibers. But
 11:23:08 20 that's what we strive for, is following the protocol,
 11:23:12 21 following the standard counting rules, and
 11:23:15 22 identification.
 11:23:16 23 Q. Hypothetically, if one of your researchers
 11:23:21 24 analyzed 150 different samples from a single mine and
 11:23:25 25 another researcher analyzed those same 150 samples,
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11:23:29 **1** would you expect the averages for both the
 11:23:31 **2** researchers to be the same?
 11:23:33 **3** MR. CIRSCH: Object to form.
 11:23:34 **4** THE WITNESS: I don't know. I'd have
 11:23:35 **5** to -- I mean, again, you have to look at the
 11:23:37 **6** data and determine what that percentage is for
 11:23:41 **7** those exact same samples and what they found
 11:23:43 **8** versus the other.
 11:23:45 **9** I wouldn't be surprised if they're in the
 11:23:47 **10** range of an average or in the range of high to
 11:23:49 **11** low. If it's not in that range, then I would
 11:23:52 **12** have to look at it to see if it's a problem or
 11:23:54 **13** not.
 11:24:03 **14** Can we go off the record for a second?
 11:24:07 **15** MR. CIRSCH: Sure.
 11:24:11 **16** (Recess from 11:24 a.m. to 11:39 a.m.)
 11:39:52 **17** **Q.** (By Mr. Chachkes) Dr. Longo, there are
 11:40:50 **18** bottles of J&J talc, cosmetic talc, where you've not
 11:40:56 **19** detected asbestos; correct?
 11:40:58 **20** **A.** **That's correct.**
 11:40:58 **21** **Q.** So for example, there are some bottles of
 11:41:02 **22** Vermont sourced J&J talc where you've not detected
 11:41:06 **23** asbestos; correct?
 11:41:07 **24** **A.** **That is correct. The better way to say**
 11:41:09 **25** **that is the asbestos, if present, is below our**
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11:41:12 **1** **detection limit.**
 11:41:13 **2** **Q.** Okay. Do you have any opinion as to
 11:41:21 **3** whether, if one of those bottles were retested,
 11:41:23 **4** whether you would get the same result?
 11:41:25 **5** MR. CIRSCH: Object to form.
 11:41:27 **6** THE WITNESS: And again, this is -- the
 11:41:29 **7** same result is either zero or nondetect below
 11:41:33 **8** our detection limit or possibly one right at the
 11:41:36 **9** detection limit, and I think we've had samples
 11:41:38 **10** like that before.
 11:41:40 **11** I think I can think of either Krystal
 11:41:45 **12** Kim's two samples and Joanne Anderson's two
 11:41:50 **13** samples, I believe one was positive and one was
 11:41:53 **14** negative, but they were two different bottles.
 11:41:57 **15** Where we have tested the two samples from
 11:42:01 **16** the same bottle would be the 1978 historical,
 11:42:05 **17** and we found them in both.
 11:42:07 **18** **Q.** (By Mr. Chachkes) Okay. I'm not asking
 11:42:08 **19** about specific bottles. So listen to the question
 11:42:11 **20** I'm asking.
 11:42:12 **21** If you had a nondetect on a bottle of J&J
 11:42:16 **22** cosmetic talc for asbestos, would you expect,
 11:42:21 **23** generally speaking, that if you ran the same test
 11:42:23 **24** again, you would get the same result, the non-deduct?
 11:42:28 **25** MR. CIRSCH: Object to form.
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11:42:29 **1** THE WITNESS: I don't have any
 11:42:30 **2** expectations one way or the other, and I think
 11:42:32 **3** we've gone over this. This is the hypothetical
 11:42:34 **4** if we analyzed it again, are we going to find
 11:42:36 **5** the same thing. It depends on, again, how many
 11:42:39 **6** asbestos fibers or bundles were detected the
 11:42:41 **7** first time.
 11:42:41 **8** If we detect one or two the first time and
 11:42:44 **9** do it again and it's zero, that's within the
 11:42:46 **10** error rate that you would expect. Or if we
 11:42:49 **11** tested again and we find that it's even more,
 11:42:53 **12** say three fibers or four fibers.
 11:42:56 **13** So you have to look at specifically on
 11:42:58 **14** what the first test is, and we're assuming the
 11:43:02 **15** first test now is a nondetect, below our
 11:43:05 **16** detection limit. And if the second test shows
 11:43:07 **17** that there is one or two regulated asbestos
 11:43:10 **18** fibers, that wouldn't surprise me.
 11:43:12 **19** **Q.** (By Mr. Chachkes) Okay. So let me ask
 11:43:15 **20** the question again because you really answered a
 11:43:16 **21** different question.
 11:43:17 **22** The question is, if you had a bottle of
 11:43:19 **23** J&J talc where you had a nondetect. I'm not asking
 11:43:23 **24** what your experience is. I'm not asking about a
 11:43:25 **25** specific bottle. I'm asking just generally speaking,
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11:43:29 **1** would you expect to have another nondetect if you
 11:43:32 **2** were to test it again -- nondetect in the first
 11:43:36 **3** instance?
 11:43:37 **4** MR. CIRSCH: Object to form.
 11:43:38 **5** THE WITNESS: I don't have an expectation
 11:43:39 **6** one way or the other. The results are what they
 11:43:41 **7** are.
 11:43:41 **8** **Q.** (By Mr. Chachkes) Can you make any
 11:43:42 **9** assumptions about a bottle of J&J cosmetic talc from
 11:43:47 **10** Vermont about the asbestos content without analyzing
 11:43:49 **11** the bottle?
 11:43:50 **12** **A.** **I don't believe you can predict just how**
 11:43:57 **13** **much asbestos is in any particular bottle without**
 11:44:00 **14** **analyzing it.**
 11:44:02 **15** **Q.** What about the possibility that there's no
 11:44:05 **16** asbestos, can you -- if you haven't analyzed a bottle
 11:44:10 **17** of J&J talc sourced from Vermont, is it possible that
 11:44:15 **18** there's no detectable asbestos?
 11:44:18 **19** MR. CIRSCH: Object to form.
 11:44:19 **20** THE WITNESS: Again, I don't have
 11:44:21 **21** expectations one way or the other. It's either
 11:44:25 **22** going to be above, at, or below our detection
 11:44:28 **23** limit, depending on the amount of regulated
 11:44:30 **24** asbestos that's in that bottle.
 11:44:31 **25** **Q.** (By Mr. Chachkes) You're not assuming
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11:44:32 **1** that a nondetect of a J&J bottle of cosmetic talc is

11:44:38 **2** an incorrect result; correct?

11:44:40 **3 A. I'm sorry, could you repeat that?**

11:44:41 **4 Q.** Yeah, I didn't do you a favor there, did

11:44:44 **5** I?

11:44:47 **6** You don't believe that a nondetect for

11:44:49 **7** asbestos on a J&J bottle of cosmetic talc means

11:44:53 **8** you've made an error?

11:44:55 **9** MR. CIRSCH: Object to form.

11:44:56 **10** THE WITNESS: No. It only means that if

11:44:59 **11** there is regulated asbestos present in that

11:45:01 **12** bottle, it's below our analytical detection

11:45:06 **13** limit.

11:45:07 **14 Q.** (By Mr. Chachkes) Your report includes

11:45:10 **15** EDXA spectra for several particles; correct?

11:45:13 **16 A. For --**

11:45:14 **17** MR. CIRSCH: Object to form.

11:45:15 **18** THE WITNESS: For several regulated

11:45:17 **19** asbestos fibers and bundles, yes.

11:45:19 **20 Q.** (By Mr. Chachkes) Describe how your

11:45:20 **21** analysts calibrate your EDXA system.

11:45:25 **22 A. It's calibrated in the QA/QC, I believe,**

11:45:28 **23 every couple of months where a standard is run and**

11:45:30 **24 then they make a determination on its count rates.**

11:45:34 **25 So whatever we have to do for the National Voluntary**
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11:45:42 **1 Laboratory Accreditation Program.**

11:45:42 **2 Q.** Do you keep that data and results on your

11:45:46 **3** QA/QC?

11:45:47 **4 A. Yes.**

11:45:48 **5 Q.** Have you ever produced it?

11:45:49 **6 A. No.**

11:45:52 **7 Q.** How often do they calibrate -- strike

11:45:57 **8** that.

11:45:57 **9** Do your analysts compare their EDXA

11:46:04 **10** spectra to known reference samples, known reference

11:46:11 **11** spectra?

11:46:11 **12 A. Yes.**

11:46:12 **13 Q.** And are those spectra from outside MAS or

11:46:16 **14** generated within MAS?

11:46:19 **15** MR. CIRSCH: Object to form.

11:46:21 **16** THE WITNESS: The reference spectras have

11:46:24 **17** been generated by MAS.

11:46:25 **18 Q.** (By Mr. Chachkes) And do your analysts

11:46:27 **19** compare their EDXA spectra to any third-party

11:46:34 **20** reference spectra?

11:46:42 **21 A. Possibly. I mean, there's plenty of**

11:46:47 **22 publications or book chapters in the past on things**

11:46:51 **23 like tremolite, richterite, winchite. Not so much on**

11:46:58 **24 richterite and winchite because it's a mineral that**

11:47:03 **25 nobody seems to have. We believe we have some now,**
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11:47:05 **1 but we'll have to check it just to determine the**

11:47:08 **2 sodium concentrations versus the potassium**

11:47:12 **3 concentrations.**

11:47:13 **4 Q.** Okay. So sitting here today, you don't

11:47:14 **5** know whether your analysts compare their EDXA spectra

11:47:17 **6** to third-party standards?

11:47:19 **7 A. No, I didn't say that.**

11:47:20 **8** MR. CIRSCH: Object to form.

11:47:21 **9** THE WITNESS: We have our own standards,

11:47:23 **10** we have the NIST standards. And quite frankly,

11:47:25 **11** a TEM analyst identifying tremolite and

11:47:28 **12** anthophyllite or iron-rich anthophyllite is

11:47:33 **13** almost elementary compared to for people with

11:47:37 **14** analysts with a lot of experience. We have the

11:47:40 **15** references.

11:47:43 **16** If you have any particular issue with any

11:47:45 **17** particular EDXA spectra that you think has been

11:47:50 **18** misidentified as one of the regulatory asbestos

11:47:52 **19** types in these reports, I would be happy to look

11:47:54 **20** at it and we can discuss it.

11:47:56 **21 Q.** (By Mr. Chachkes) I would like you to

11:47:57 **22** listen carefully to the question.

11:47:58 **23** The question is: For the EDXA spectra in

11:48:04 **24** your report, the conclusions made about which mineral

11:48:06 **25** that is based on the EDX -- which crystal that is
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11:48:10 **1** based on the EDXA spectra, was that done comparing

11:48:14 **2** the spectra to a third-party standard?

11:48:16 **3** MR. CIRSCH: Object to form.

11:48:17 **4** THE WITNESS: Are you asking a third-party

11:48:19 **5** standard spectra or a third-party standard

11:48:23 **6** mineral like NIST?

11:48:26 **7 Q.** (By Mr. Chachkes) Okay. How about a

11:48:29 **8** third-party standard, any third-party standard,

11:48:32 **9** somebody else other than your lab generated this

11:48:34 **10** spectra, you used that as a standard?

11:48:36 **11 A. I don't know if we've looked at any other**

11:48:39 **12 third-party spectra other than what has been -- I**

11:48:45 **13 think Jim Millette has published in the past. I know**

11:48:48 **14 we have his stuff. I believe McCrone has also. I**

11:48:53 **15 have to look in the particle analysis if they've done**

11:48:56 **16 that. But typically we rely on the actual minerals**

11:48:59 **17 and the spectras that we've generated in the past**

11:49:01 **18 from the standards.**

11:49:02 **19 Q. So the question isn't about whether**

11:49:04 **20 third-party standards exist. I'm talking about the**

11:49:07 **21 functional day-to-day your analysts doing an EDXA**

11:49:11 **22 spectra. Sitting there, does he look over at some**

11:49:15 **23 third-party document, or does he look at an MAS**

11:49:19 **24 internal document to determine this is what I'm**

11:49:21 **25 looking at?**
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11:49:22 1 MR. CIRSCH: Object to form.
11:49:23 2 THE WITNESS: I doubt he's looking at when
11:49:25 3 he takes a spectra of either tremolite series or
11:49:28 4 anthophyllite series that he's turning over and
11:49:31 5 looking at a known reference. These analysts
11:49:34 6 have been doing this for years and years and
11:49:37 7 years.
11:49:37 8 We have references, but I can't imagine
11:49:43 9 every time he takes an EDX spectra that looks
11:49:47 10 the same time after time after time that he's
11:49:49 11 looking at a third-party reference at that
11:49:51 12 particular point in time.
11:49:52 13 Q. (By Mr. Chachkes) Okay. How many
11:49:56 14 different analysts do you have doing EDXA spectra?
11:49:59 15 A. Four.
11:49:59 16 Q. Does NIST have an EDXA reference spectra
11:50:06 17 for the various asbestos?
11:50:11 18 MR. CIRSCH: Object to form.
11:50:12 19 THE WITNESS: I think you already asked
11:50:14 20 that. And besides not having a -- providing a
11:50:16 21 TEM photo, they do not provide an actual
11:50:22 22 spectra. But I think most -- I think there's a
11:50:26 23 number of third-party references I believe just
11:50:28 24 give you the ratios of what you would see in
11:50:31 25 EDXA for the magnesium, the silicon, the
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11:50:37 1 calcium, potentially some iron, tremolite, or
11:50:41 2 actinolite.
11:50:43 3 Q. (By Mr. Chachkes) Why is EDXA useful?
11:50:47 4 A. Provides the inorganic, and depending on
11:50:52 5 your detector, organic chemistry of any particular
11:50:56 6 elongated particulate.
11:50:58 7 Q. When you look at an EDXA spectra, do you
11:51:03 8 assume it's a regulated particle and then look to
11:51:07 9 which regulated particles have the metal-to-silicon
11:51:11 10 ratio that correspond?
11:51:14 11 MR. CIRSCH: Object to form.
11:51:15 12 THE WITNESS: Well, we typically don't do
11:51:18 13 an EDX spectra unless it meets the definition of
11:51:22 14 a regulated -- it has the potential for a
11:51:27 15 regulated asbestos fiber or bundle.
11:51:29 16 So it's got to be at least .5 micrometers
11:51:33 17 in length or greater, it's got to have an equal
11:51:36 18 to -- greater than or equal to 5-to-1 aspect
11:51:41 19 ratio, and parallel sides. Then the analyst --
11:51:46 20 first thing I would assume is do EDXA and check
11:51:50 21 the chemistry. And then SAED.
11:51:55 22 Q. (By Mr. Chachkes) If your analyst sees
11:51:58 23 something that's, what did you say, greater than .55
11:52:04 24 millimeters?
11:52:05 25 A. Microns.
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1 Q. Microns, I'm sorry.
11:52:06 2 A. Micrometers.
11:52:06 3 Q. Okay. So strike that.
11:52:08 4 If your analyst sees something that's
11:52:11 5 greater than .5 micrometers and has an aspect ratio
11:52:14 6 of at least 5-to-1, then he might do EDXA?
11:52:18 7 A. If it has parallel sides, yes. And he may
11:52:25 8 do SAED. It doesn't matter which one. But then he
11:52:29 9 would have to go through the sequence of determining
11:52:31 10 if it meets the definition for the regulated asbestos
11:52:35 11 chemistry and the crystalline structure.
11:52:37 12 Q. Are there minerals that exist in the world
11:52:40 13 other than regulated particles, regulated asbestos
11:52:44 14 particles, that are greater than .5 micrometers and
11:52:50 15 can have an aspect ratio of greater than 5-to-1?
11:52:53 16 MR. CIRSCH: Object to form.
11:52:54 17 Q. (By Mr. Chachkes) And with parallel
11:52:56 18 sides?
11:52:56 19 A. Yes.
11:52:56 20 Q. Potentially dozens if not hundreds; right?
11:53:01 21 A. I haven't counted them all up. But what
11:53:04 22 we potentially see is asbestiform talc bundles or
11:53:08 23 fibers all the time. So, yeah, you have to
11:53:12 24 distinguish between a talc fiber or bundle and an
11:53:17 25 anthophyllite fiber or bundle.
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11:53:18 1 Q. The question really is about minerals, so
11:53:20 2 let's focus on what I've just asked, which is: There
11:53:25 3 are potentially dozens if not hundreds of minerals
11:53:29 4 that can have parallel sides, that can have -- be
11:53:34 5 bigger than .5 micrometers, and have aspect ratios
11:53:37 6 that are 5-to-1 or greater?
11:53:39 7 MR. CIRSCH: Object to form.
11:53:40 8 THE WITNESS: And I apologize, but I just
11:53:42 9 stated I haven't counted them up. And really,
11:53:46 10 we're not interested in the hundreds or whatever
11:53:47 11 it is around the world.
11:53:49 12 It's primarily what do we find in the talc
11:53:55 13 deposits that are asbestiform or fibrous and
11:54:00 14 meet those definitions. And typically the only
11:54:04 15 thing we routinely see is fibrous talc. Every
11:54:10 16 now and then an antigorite fiber may show up.
11:54:16 17 But I don't -- to answer your question you
11:54:19 18 asked, I haven't counted how many are out there.
11:54:21 19 Q. (By Mr. Chachkes) Does MAS conduct
11:54:24 20 qualitative EDS analysis or quantitative EDS
11:54:27 21 analysis?
11:54:28 22 A. I believe every spectra in here is
11:54:31 23 quantitative EDS analysis.
11:54:33 24 Q. So you actually calculate the peak sizes
11:54:36 25 and do the math?
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11:54:37 **1 A. We can, but we take the raw data, so that**
 11:54:41 **2 has to have at least 300 seconds of collection. But**
 11:54:46 **3 it's easy to do. You can actually calculate the**
 11:54:51 **4 concentration of the oxides under the peaks. We**
 11:54:54 **5 don't normally do that unless it's necessary.**
 11:54:58 **6 Q.** So when you -- just to summarize, when you
 11:55:07 **7** do identification of mineral by EDXA, you are
 11:55:13 **8** assuming that it's not any of the potentially dozens
 11:55:17 **9** or hundreds of other minerals that aren't regulated;
 11:55:22 **10** correct?
 11:55:22 **11** MR. CIRSCH: Object to form.
 11:55:23 **12** THE WITNESS: That's not what I said. I
 11:55:24 **13** said I didn't know them all. But there's no
 11:55:27 **14** minerals out there that has all the
 11:55:29 **15** characteristics of a specific type of a
 11:55:32 **16** regulated asbestos fiber, and that's why you go
 11:55:36 **17** through the analytical process.
 11:55:39 **18** You can get other fibrous materials, but
 11:55:42 **19** they'll have aluminum or the
 11:55:47 **20** magnesium-to-silicon ratios are off. But you
 11:55:50 **21** just don't see that many of these other than
 11:55:53 **22** fibrous talc.
 11:55:54 **23** So of course we don't make an assumption
 11:55:56 **24** what it is. That's why you do the chemistry and
 11:55:59 **25** the selected area electron diffraction.

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11:56:04 **1 Q.** (By Mr. Chachkes) How many minerals have
 11:56:06 **2** the same constituent elements as regulated asbestos?
 11:56:13 **3** MR. CIRSCH: Object to form.
 11:56:14 **4** THE WITNESS: Don't know.
 11:56:14 **5 Q.** (By Mr. Chachkes) It could be hundreds?
 11:56:16 **6** MR. CIRSCH: Object to form.
 11:56:17 **7** THE WITNESS: It's not a matter if it has
 11:56:19 **8** the same constituents --
 11:56:21 **9 Q.** (By Mr. Chachkes) My question was --
 11:56:22 **10** MR. CIRSCH: Hold on. Let him answer the
 11:56:24 **11** question, please.
 11:56:25 **12** THE WITNESS: I haven't -- again, I
 11:56:26 **13** haven't tried to sit down and go through all the
 11:56:28 **14** minerals in the world that may have magnesium,
 11:56:31 **15** silicon, or magnesium, silicon, and calcium.
 11:56:37 **16** What's important is the ratio to the standards
 11:56:40 **17** to the chemistry to the selected area electron
 11:56:44 **18** diffraction.
 11:56:44 **19** MR. CHACHKES: Okay. Let's mark as
 11:56:45 **20** Exhibit 12.
 11:56:45 **21** (Defendants' Exhibit 12 was marked for
 11:56:58 **22** identification.)
 11:56:58 **23 Q.** (By Mr. Chachkes) This is an extracted
 11:57:00 **24** page from page 132 of your report. Do you recognize
 11:57:05 **25** this as one of your EDXA spectra?

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11:57:08 **1 A. I do recognize it.**
 11:57:10 **2 Q.** Okay. Now, up at the top it says -- do
 11:57:13 **3** you see where it says tremolite?
 11:57:14 **4 A. Yes.**
 11:57:14 **5 Q.** You typed that in, right, or your lab
 11:57:17 **6** typed that in?
 11:57:19 **7 A. After they identified it, yes.**
 11:57:21 **8 Q.** Okay. What's the name of the software you
 11:57:28 **9** use to generate this spectra?
 11:57:31 **10 A. You got me there. I don't know the name**
 11:57:33 **11 of the software. It's whatever the EDS system is on**
 11:57:37 **12 this particular one. It's not a light element**
 11:57:39 **13 detector. It comes with the EDXA system. I don't**
 11:57:44 **14 know what they call their software.**
 11:57:46 **15 Q.** Do you run the EDXA yourself?
 11:57:49 **16 A. Not anymore, no.**
 11:57:50 **17 Q.** Did you run any EDXA for any of the
 11:57:53 **18** samples in the MDL?
 11:58:00 **19 A. No, sir.**
 11:58:00 **20 Q.** And walk me through how you determine the
 11:58:03 **21** chemical composition of a -- what you're looking at
 11:58:07 **22** from the spectra.
 11:58:10 **23** MR. CIRSCH: Object to form.
 11:58:11 **24** THE WITNESS: How far back do you want me
 11:58:14 **25** to start?

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11:58:14 **1 Q.** (By Mr. Chachkes) Well, let me ask you
 11:58:15 **2** this.
 11:58:16 **3 A. Electrons hit the solid -- electron beam**
 11:58:20 **4 hits the solid with enough energy to eject elements**
 11:58:23 **5 out of their orbital.**
 11:58:23 **6 Q.** We're not --
 11:58:26 **7 A. You don't want me to go back that far?**
 11:58:27 **8 Q.** No.
 11:58:27 **9 A. Okay.**
 11:58:27 **10 Q.** So you look at the areas of the peaks;
 11:58:27 **11** right?
 11:58:30 **12 A. No, what we -- we look at the peak ratios,**
 11:58:34 **13 the areas -- you can't look at the areas, but the**
 11:58:37 **14 peak ratios is what's important here. This is a**
 11:58:42 **15 typical tremolite with a small amount of iron, so**
 11:58:44 **16 this would not be enough iron to get into the**
 11:58:46 **17 actinolite range. There's no potassium. I don't see**
 11:58:52 **18 much of a sodium peak, so I would call this just**
 11:58:57 **19 tremolite.**
 11:58:57 **20 So the electron beam is put on a spot size**
 11:59:01 **21 onto the bundle or fiber, and the system essentially**
 11:59:04 **22 is turned on and starts collecting x-rays from the**
 11:59:08 **23 different energy levels that are consistent with the**
 11:59:12 **24 different elements.**
 11:59:12 **25 Q.** Okay. Let's just focus on you said you

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11:59:15 **1** look at the ratios of the peaks; right?
11:59:18 **2** MR. CIRSCH: Object to form.
11:59:19 **3** **Q.** (By Mr. Chachkes) Am I misstating your
11:59:21 **4** testimony?
11:59:21 **5** **A.** **No. I guess I'm trying to understand what**
11:59:24 **6** **you're asking. Maybe you should repeat the question.**
11:59:26 **7** **Q.** Okay. You've got a -- I'm not asking how
11:59:30 **8** the machine works. I'm asking you how you take this
11:59:33 **9** result in Exhibit 12 and turn that into a conclusion.
11:59:38 **10** So I'm asking do you look at the ratio of
11:59:43 **11** the peak heights -- is that one of the things you
11:59:47 **12** look at?
11:59:48 **13** **A.** **Yes.**
11:59:48 **14** **Q.** Okay. What's the ratio you look at
11:59:49 **15** specifically?
11:59:51 **16** MR. CIRSCH: Object to form.
11:59:52 **17** **THE WITNESS: You have a magnesium and**
11:59:54 **18** **calcium peak that are pretty close. Typically**
11:59:57 **19** **the calcium peak can be a little lower.**
11:59:59 **20** **If it's a light element detector, the**
12:00:01 **21** **magnesium can be a little higher, the silicon**
12:00:05 **22** **will be your primary peak, somewhere in the 25**
12:00:09 **23** **to 30 percent of the magnesium for a non-light**
12:00:10 **24** **element detector. And the calcium peaks and the**
12:00:15 **25** **magnesium peaks are usually very similar in**

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12:00:17 **1** **size.**
12:00:17 **2** **And then we look at the amount of iron to**
12:00:20 **3** **see if we're going to call it actinolite versus**
12:00:23 **4** **tremolite. And not aware of any other minerals**
12:00:27 **5** **out there that have those ratios, so that's how**
12:00:34 **6** **I call it tremolite.**
12:00:35 **7** **Q.** (By Mr. Chachkes) When you say ratio,
12:00:36 **8** **what are you doing? You're adding, what, the height**
12:00:38 **9** **of the metals to -- for the numerator and then on the**
12:00:43 **10** **denominator is the height of the silicon peak?**
12:00:47 **11** **A.** **We're looking at the silicon peak versus**
12:00:49 **12** **the magnesium and the calcium peak, and we're looking**
12:00:53 **13** **at the magnesium and the calcium peak to determine**
12:00:56 **14** **if -- how much they line up together. It could be a**
12:01:00 **15** **little higher, it could be lower, but I would call it**
12:01:04 **16** **typical tremolite peak.**
12:01:05 **17** **Q.** And if I --
12:01:06 **18** **A.** **Tremolite chemistry.**
12:01:08 **19** **Q.** If I want to go to a third-party source
12:01:11 **20** that confirms that this is the appropriate way to
12:01:13 **21** analyze EDXA data, what would you point me to?
12:01:16 **22** MR. CIRSCH: Object to form.
12:01:17 **23** THE WITNESS: I'd have to look through the
12:01:21 **24** protocols, but I believe they give you all the
12:01:24 **25** ratios and say the AHERA, the ISO. They don't

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12:01:28 **1** give you a peak, but they'll write out what the
12:01:31 **2** ratio ranges are.
12:01:33 **3** **Q.** (By Mr. Chachkes) Okay. And those ratios
12:01:35 **4** are -- are they simply the peak height, or do they
12:01:37 **5** take into account the peak area?
12:01:39 **6** **A.** **Well, the peak height and the peak area**
12:01:43 **7** **are consistent. I mean, the peak area is going to --**
12:01:50 **8** **the peak height is going to depend on the area,**
12:01:52 **9** **because as the area of the peak builds up, that's**
12:01:56 **10** **just more counts.**
12:01:57 **11** **If you change the chemistry,**
12:01:59 **12** **hypothetically, of, say, tremolite, you have added**
12:02:03 **13** **more magnesium elements to it, you're going to have**
12:02:07 **14** **higher peaks, so they're interrelated.**
12:02:10 **15** **Q.** Do the standards that you're referring to
12:02:12 **16** refer to simply peak height or they refer to peak
12:02:14 **17** area?
12:02:14 **18** MR. CIRSCH: Object to form.
12:02:15 **19** THE WITNESS: All the standards in the TEM
12:02:17 **20** protocols usually typically just give you
12:02:20 **21** ratios. So I don't -- and if you look in the
12:02:24 **22** identification, usually they will spell it out,
12:02:27 **23** like this is the ratio for tremolite, this is
12:02:29 **24** the ratio for chrysotile, and so on.
12:02:30 **25** **Q.** (By Mr. Chachkes) My question is the

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12:02:31 **1** ratio of what? Is it ratio of just simply height, or
12:02:35 **2** is it ratio of peak area?
12:02:38 **3** **A.** **Peak area and peak height are**
12:02:40 **4** **interchangeable. It's not -- the peak area, if**
12:02:44 **5** **you're going to calculate the oxides -- the peak**
12:02:51 **6** **area -- it's not the peak area.**
12:02:53 **7** **Let's make it simple. It's not the peak**
12:02:55 **8** **area. It's the peak height.**
12:02:57 **9** **Q.** Okay. And that's what the standards say,
12:02:59 **10** peak height?
12:03:00 **11** MR. CIRSCH: Object to form.
12:03:01 **12** THE WITNESS: I believe so.
12:03:01 **13** **Q.** (By Mr. Chachkes) Okay. And one measures
12:03:03 **14** that simply -- you just take a ruler and place it
12:03:06 **15** vertically and you could get a peak height?
12:03:09 **16** **A.** **Yeah, you could, if you wanted to.**
12:03:11 **17** **Q.** Okay. Do you actually do that
12:03:12 **18** quantitatively with numbers, or do you just kind of
12:03:15 **19** eyeball it?
12:03:17 **20** MR. CIRSCH: Object to form.
12:03:18 **21** THE WITNESS: All the analysts would --
12:03:21 **22** could probably draw that. You know, it's years
12:03:24 **23** and years' experience. You don't have to take
12:03:25 **24** the ratios. And if you look at the standards,
12:03:29 **25** they will look pretty much identical to that.

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12:03:31 **1** But again, you have to be careful if
 12:03:33 **2** you're looking at a windowless detector, which
 12:03:38 **3** is more sensitive for the different elements.
 12:03:39 **4** **Q.** (By Mr. Chachkes) My question is about
 12:03:41 **5** what your analysts actually do. Do they actually
 12:03:43 **6** quantify the heights and run the numbers, or are they
 12:03:46 **7** eyeballing it?
 12:03:49 **8** MR. CIRSCH: Object to form.
 12:03:49 **9** THE WITNESS: I think at this stage of
 12:03:51 **10** their careers they're just visually confirming
 12:03:54 **11** the proper elements and the proper ratios.
 12:03:56 **12** **Q.** (By Mr. Chachkes) And the software can
 12:04:01 **13** generate those numbers; right?
 12:04:04 **14** **A.** The software generates the height? The
 12:04:07 **15** ratios?
 12:04:08 **16** **Q.** Yes.
 12:04:08 **17** **A.** I don't know.
 12:04:09 **18** **Q.** So look at the bottom of Exhibit 12 in the
 12:04:12 **19** bottom left. Do you see how it says magnesium,
 12:04:19 **20** silicon, calcium, iron, down there on the bottom
 12:04:23 **21** left; do you see that?
 12:04:23 **22** **A.** Yes.
 12:04:24 **23** **Q.** You can print out some -- there's data
 12:04:26 **24** that goes there that the software can generate;
 12:04:26 **25** correct?

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12:04:29 **1** **A.** That's correct.
 12:04:29 **2** **Q.** Why don't you generate it? Why don't you
 12:04:31 **3** generate it?
 12:04:32 **4** MR. CIRSCH: Object to form.
 12:04:33 **5** THE WITNESS: There's no need to. It's
 12:04:35 **6** not required for this type of analysis to
 12:04:38 **7** identify tremolite.
 12:04:39 **8** **Q.** (By Mr. Chachkes) Do you have that data
 12:04:41 **9** somewhere still saved in a machine somewhere?
 12:04:44 **10** **A.** That, I don't know.
 12:04:45 **11** **Q.** Okay. We are going to request that to be
 12:04:48 **12** produced. I know your machine generates it. So if
 12:04:51 **13** you could see whether you could produce that, we'd
 12:04:54 **14** appreciate it.
 12:04:55 **15** MS. O'DELL: We'll consider your request.
 12:04:58 **16** We're making no commitment we're going to do
 12:05:00 **17** that.
 12:05:00 **18** MR. CHACHKES: Okay.
 12:05:00 **19** **Q.** (By Mr. Chachkes) You don't deliberately
 12:05:01 **20** delete that data, do you?
 12:05:03 **21** MR. CIRSCH: Object to form.
 12:05:04 **22** THE WITNESS: No, sir, I have not
 12:05:05 **23** deliberately deleted that data.
 12:05:07 **24** **Q.** (By Mr. Chachkes) You don't instruct your
 12:05:08 **25** researchers to delete that data, do you?

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12:05:10 **1** MR. CIRSCH: Object to form.
 12:05:11 **2** THE WITNESS: No. It's just not -- that
 12:05:14 **3** data is just not something I'm relying on for my
 12:05:16 **4** opinions in this case.
 12:05:17 **5** **Q.** (By Mr. Chachkes) And that data being the
 12:05:19 **6** specific numerical representation of the peak
 12:05:23 **7** heights?
 12:05:23 **8** MR. CIRSCH: Object to form.
 12:05:24 **9** THE WITNESS: I believe what that gives
 12:05:25 **10** you is the percentage of one element to the
 12:05:27 **11** other, not peak heights.
 12:05:29 **12** **Q.** (By Mr. Chachkes) You're sure of that?
 12:05:31 **13** MR. CIRSCH: Object to form.
 12:05:32 **14** THE WITNESS: Pretty sure.
 12:05:33 **15** **Q.** (By Mr. Chachkes) Okay. But anyway, you
 12:05:37 **16** didn't produce that data in your report, did you?
 12:05:39 **17** MR. CIRSCH: Object to form.
 12:05:39 **18** THE WITNESS: No, sir. It's not something
 12:05:41 **19** that's required to render my opinions in this
 12:05:43 **20** case --
 12:05:44 **21** **Q.** (By Mr. Chachkes) Okay.
 12:05:45 **22** **A.** -- in this MDL.
 12:05:56 **23** MR. CHACHKES: Let's just mark this as
 12:05:57 **24** Exhibit 13.
 12:05:58 **25** (Defendants' Exhibit 13 was marked for

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12:06:15 **1** identification.)
 12:06:16 **2** **Q.** (By Mr. Chachkes) All right. Look on the
 12:06:19 **3** last page of Exhibit 13. There appears to be an EDXA
 12:06:23 **4** spectra; do you see that?
 12:06:24 **5** **A.** I do.
 12:06:25 **6** **Q.** And it appears to be generated by the same
 12:06:29 **7** software as you're using. All the fonts are the
 12:06:31 **8** same; everything appears to be the same. Do you have
 12:06:34 **9** any opinion on that?
 12:06:34 **10** MR. CIRSCH: Object to form.
 12:06:35 **11** THE WITNESS: No.
 12:06:35 **12** **Q.** (By Mr. Chachkes) All that information on
 12:06:38 **13** the lower left-hand corner in the Exhibit 13, you
 12:06:42 **14** could generate that information; right?
 12:06:44 **15** MR. CIRSCH: Object to form.
 12:06:45 **16** THE WITNESS: I don't know if we have the
 12:06:47 **17** same software, same software upgrades, so I
 12:06:50 **18** can't comment on that.
 12:06:51 **19** **Q.** (By Mr. Chachkes) Can you generate that
 12:06:52 **20** information that's down there in the lower left-hand
 12:06:55 **21** corner --
 12:06:55 **22** MR. CIRSCH: Object to form.
 12:06:56 **23** **Q.** (By Mr. Chachkes) -- on Exhibit 13, last
 12:06:57 **24** page?
 12:06:57 **25** **A.** And I don't mean to be disrespectful, but

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12:07:00 **1 I don't know. I don't know if we have the same**
 12:07:02 **2 updated software, et cetera, so I can't say one way**
 12:07:05 **3 or the other.**
 12:07:05 **4 Q.** Do you know whether the data you have from
 12:07:13 **5** your EDXA runs allows you to calculate numerical
 12:07:20 **6** values for the weight percentage of the elements?
 12:07:23 **7 A. I believe I've just already stated I'm**
 12:07:27 **8 not -- I don't know what software system we have and**
 12:07:31 **9 can it do that or not.**
 12:07:32 **10 Q.** Okay. And same question, so whether you
 12:07:35 **11** can generate the standard definitions or atomic
 12:07:39 **12** percentages or all those other ones, you just don't
 12:07:43 **13** know one way or the other whether you can calculate
 12:07:46 **14** those numbers using your EDXA apparatus?
 12:07:50 **15** MR. CIRSCH: Object to form.
 12:07:51 **16** THE WITNESS: It may be possible and we
 12:07:52 **17** may be able to. I just don't know until I ask.
 12:08:01 **18 Q.** (By Mr. Chachkes) Do you know of any
 12:08:06 **19** third-party published source that approves of
 12:08:11 **20** eyeballing EDXA spectra to determine what the
 12:08:14 **21** composition of the material you're looking at?
 12:08:17 **22** MR. CIRSCH: Object to form.
 12:08:17 **23** THE WITNESS: Yes.
 12:08:18 **24 Q.** (By Mr. Chachkes) What?
 12:08:18 **25 A. All the assessors that ever walked in our**
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12:08:25 **1 lab with the National Voluntary Laboratory**
 12:08:26 **2 Accreditation Program do not require anybody to**
 12:08:28 **3 measure peak heights and look at ratios for tremolite**
 12:08:32 **4 or any of these.**
 12:08:35 **5 You may want to make a green analyst who**
 12:08:38 **6 hasn't been doing this for a while do that if he has**
 12:08:41 **7 some issues, but it's not something that I've ever**
 12:08:44 **8 seen the auditors say that is necessary.**
 12:08:46 **9 Q.** Is there any --
 12:08:47 **10** MR. CIRSCH: Did you finish your answer?
 12:08:49 **11** THE WITNESS: Yes.
 12:08:49 **12 Q.** (By Mr. Chachkes) Is there any
 12:08:50 **13** peer-reviewed literature that approves of eyeballing
 12:08:54 **14** EDXA patterns to determine the chemical composition
 12:08:57 **15** you're looking at?
 12:08:58 **16** MR. CIRSCH: Object to form.
 12:08:59 **17 Q.** (By Mr. Chachkes) Peer-reviewed
 12:09:00 **18** literature.
 12:09:00 **19 A. I don't know of any peer-reviewed**
 12:09:02 **20 literature that says that comparing the spectras or**
 12:09:07 **21 looking at the spectras and comparing them should not**
 12:09:10 **22 be done, that you have to use a ruler for every one**
 12:09:13 **23 of them. I'm not aware of any literature that states**
 12:09:15 **24 that, peer-reviewed literature.**
 12:09:16 **25 Q.** Not my question. Any peer-reviewed
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12:09:19 **1** literature that says eyeballing it is okay?
 12:09:22 **2** MR. CIRSCH: Object to form.
 12:09:23 **3** THE WITNESS: I wouldn't put it eyeballing
 12:09:26 **4** comparing to the standards and looking at the
 12:09:28 **5** ratios.
 12:09:29 **6** I'm not aware of any peer-reviewed
 12:09:32 **7** literature that makes that affirmative or
 12:09:34 **8** negative statement one way or the other.
 12:09:36 **9 Q.** (By Mr. Chachkes) But you are aware of
 12:09:37 **10** peer-reviewed literature that uses actual
 12:09:39 **11** quantitative numbers and calculates the kind of
 12:09:43 **12** information we see in Exhibit 13 which is like weight
 12:09:47 **13** percentages; you're aware of that; right?
 12:09:48 **14** MR. CIRSCH: Object to form.
 12:09:50 **15** THE WITNESS: For this type of analysis
 12:09:52 **16** where you're just confirming, I'm not aware of
 12:09:56 **17** any. Maybe there is. Show some if you have
 12:10:01 **18** one.
 12:10:01 **19 Q.** (By Mr. Chachkes) So when you say just
 12:10:03 **20** confirming, you're not using EDXA to determine in a
 12:10:08 **21** vacuum what I'm looking at. You've already made some
 12:10:10 **22** assumptions about what you may be looking at?
 12:10:12 **23 A. No, we never make assumptions. We do the**
 12:10:15 **24 chemistry, and the chemistry is unique. If you go**
 12:10:18 **25 through here -- I was just looking at some. You**
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12:10:19 **1 know, hornblende. Well, there's no aluminum in**
 12:10:23 **2 tremolite. It's fairly straightforward.**
 12:10:26 **3 Q.** Okay. You don't redact the information
 12:10:38 **4** that's in the lower left-hand corner of what's been
 12:10:41 **5** marked as Exhibit 12; right?
 12:10:44 **6 A. No.**
 12:10:44 **7** MR. CIRSCH: Object to form.
 12:10:45 **8 Q.** (By Mr. Chachkes) And you've never
 12:10:46 **9** redacted that information, have you?
 12:10:48 **10** MR. CIRSCH: Object to form.
 12:10:49 **11** THE WITNESS: No.
 12:10:49 **12 Q.** (By Mr. Chachkes) Were they trained not
 12:10:56 **13** to fill in the lower left-hand corner, your analysts?
 12:11:00 **14** MR. CIRSCH: Object to form.
 12:11:01 **15** THE WITNESS: They weren't trained one way
 12:11:02 **16** or the other. It's not required for our
 12:11:04 **17** certifications. NVLAP does not require you to
 12:11:09 **18** run weight percentages, oxides, or any of that.
 12:11:11 **19** You have to demonstrate your ability to identify
 12:11:16 **20** regulated asbestos.
 12:11:19 **21** We've never had it be suggested that we
 12:11:22 **22** are misidentifying tremolite in any
 12:11:26 **23** circumstance.
 12:11:27 **24 Q.** (By Mr. Chachkes) All right. So the
 12:11:38 **25** first step in analyzing an EDXA, though, is to
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12:11:41 **1** determine the ratio of the metals to silicon; right?

12:11:45 **2** **A. The first step?**

12:11:46 **3** **Q.** Yeah.

12:11:47 **4** **A. The first step -- the first step is to**

12:11:50 **5 take the spectra and to verify that it is one of the**

12:11:56 **6 regulated asbestos minerals -- regulated asbestos**

12:12:02 **7 types that is of issue, or any issue, for any of**

12:12:06 **8 them.**

12:12:06 **9** **Q.** Do you conclude you're looking at a

12:12:09 **10 regulated asbestos prior to doing the ratio analysis?**

12:12:14 **11** **A. No.**

12:12:15 **12** **Q.** Okay. So prior to determining there's --

12:12:19 **13** what you're looking at, what kind of mineral you're

12:12:21 **14** looking at, you determine the ratio of the metals to

12:12:26 **15** silicon; is that correct?

12:12:28 **16** **A. Before anything is done, we take the**

12:12:30 **17 microchemistry of an individual fiber and look at the**

12:12:34 **18 typical elements that you would expect.**

12:12:38 **19** **Q.** You seem to not want to answer about the

12:12:40 **20** EDXA.

12:12:41 **21** **MR. CIRSCH:** I don't think he was finished

12:12:43 **22** answering it.

12:12:43 **23** **Q.** (By Mr. Chachkes) All right. I'm talking

12:12:44 **24** about the EDXA.

12:12:45 **25** **A. That's what I'm saying.**

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12:12:46 **1** **Q.** So you've got the EDXA result in your

12:12:50 **2** hands. This result, 12, before you've determined

12:12:54 **3** what it is, is the first step determining the ratio

12:12:57 **4** of metals to silicon --

12:12:59 **5** **MR. CIRSCH:** Object to form.

12:13:00 **6** **Q.** (By Mr. Chachkes) -- to interpret this

12:13:01 **7** EDXA?

12:13:02 **8** **A. The first step would be to look at this**

12:13:04 **9 EDXA -- and I'm just speaking for me -- and I would**

12:13:07 **10 see that the ratios are consistent with what I would**

12:13:12 **11 expect for tremolite from the standards. That would**

12:13:15 **12 be my first step.**

12:13:17 **13** **Q.** But you don't know whether those ratios

12:13:20 **14** are consistent with other minerals as well that are

12:13:22 **15** non-regulated?

12:13:25 **16** **MR. CIRSCH:** Object to form.

12:13:26 **17** **THE WITNESS:** I'm not aware of any ratios

12:13:28 **18** like that for any other non-regulated fibrous

12:13:31 **19** minerals.

12:13:33 **20** **Q.** (By Mr. Chachkes) Are you excluding the

12:13:34 **21** possibility that they exist, or you're saying you're

12:13:36 **22** just not aware?

12:13:37 **23** **A. We've never seen them, so I guess I'm**

12:13:41 **24** **excluding the possibility that they exist.**

12:13:44 **25** **Q.** Okay.

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12:13:45 **1** **A. It's hard to prove a negative, but it is**

12:13:48 **2 not one of the look-alikes of that type of ratio**

12:13:52 **3 that's fibrous. And of course we're leaving out the**

12:13:55 **4 SAED to make sure it has an amphibole type**

12:13:59 **5 diffraction pattern.**

12:14:00 **6** **Q.** Prior to any EDXA, you've already

12:14:04 **7** determined it's an amphibole?

12:14:05 **8** **A. No. Nothing is determined about this**

12:14:07 **9 particular structure other than it's fibrous, it**

12:14:15 **10 meets the counting criteria for what would be a**

12:14:19 **11 regulated asbestos fiber if in fact the chemistry in**

12:14:23 **12 the crystalline structure are consistent with the**

12:14:27 **13 appropriate mineral.**

12:14:29 **14** **Q.** Okay. You would agree that two different

12:14:34 **15** minerals can have similar EDXA readouts; correct?

12:14:38 **16** **MR. CIRSCH:** Object to form.

12:14:39 **17** **THE WITNESS:** It depends on what you mean

12:14:40 **18** by similar. I can't answer that hypothetical.

12:14:46 **19** **Q.** (By Mr. Chachkes) Okay. So, for example,

12:14:52 **20** anthophyllite and cummingtonite have similar EDXA

12:14:56 **21** spectra; correct?

12:14:57 **22** **A. That's correct. Anthophyllite, depending**

12:15:01 **23 on the iron content, anthophyllite, cummingtonite,**

12:15:07 **24 two regulated asbestos types, yes, they can have**

12:15:10 **25 similar EDS.**

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12:15:11 **1** **Q.** Okay. When you say EDS, you mean the same

12:15:16 **2** thing as EDXA?

12:15:18 **3** **A. Correct. I'm sorry. I'm old, and that's**

12:15:20 **4 what we learned back in graduate school, it was EDS.**

12:15:24 **5 It's hard for me to go to EDXA.**

12:15:26 **6** **Q.** All right. So you discussed your first

12:15:27 **7** step is to make some conclusions about what you're

12:15:28 **8** looking at just by eyeballing it.

12:15:30 **9** The next step, do you determine the ratios

12:15:33 **10** of the metals to the silicon?

12:15:35 **11** **MR. CIRSCH:** Object to form.

12:15:36 **12** **THE WITNESS:** Well, let's back up here. I

12:15:38 **13** don't make any conclusions by eyeballing it.

12:15:41 **14** The first thing we do is look at it and

12:15:44 **15** say this could match the counting rules for a

12:15:48 **16** regulated elongated particle.

12:15:48 **17** It's at least greater than .5 micrometers

12:15:51 **18** in length. These are measurements. These are

12:15:53 **19** not eyeballing. It has parallel sides and has

12:15:56 **20** at least a 5-to-1 aspect ratio or greater.

12:16:00 **21** Then the EDXA for me is taken to see if it

12:16:07 **22** is consistent with the ratios and patterns I

12:16:11 **23** would expect for some -- for the types of

12:16:13 **24** regulated asbestos fibers we're looking at.

12:16:15 **25** And we're not saying, okay, we're going to

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12:16:18 **1** eliminate this type or that type. It's
 12:16:21 **2** whatever's present.
 12:16:22 **3** Then the SAED -- so it has a typical
 12:16:25 **4** amphibole diffraction pattern. If it's
 12:16:27 **5** anthophyllite, potentially, we'll rotate the
 12:16:30 **6** stage 10 to 20 degrees to eliminate the
 12:16:33 **7** once-in-a-blue-moon reflection of a fibrous talc
 12:16:37 **8** that some people claim that's close to
 12:16:39 **9** anthophyllite.
 12:16:40 **10** And after all that, then we would -- I
 12:16:43 **11** would say that is a regulated asbestos fiber
 12:16:46 **12** type. It meets all the criteria.
 12:16:49 **13** You keep saying eyeballing. That's not
 12:16:52 **14** really much of a term --
 12:16:54 **15** **Q.** (By Mr. Chachkes) My questions are all
 12:16:55 **16** about --
 12:16:58 **17** MR. CIRSCH: Wait, he's not finished.
 12:16:59 **18** THE WITNESS: Wait. I'm not done.
19 MR. CIRSCH: You cut him off.
20 THE REPORTER: Wait. Wait. Wait.
21 THE WITNESS: What we're doing is we're
 12:17:01 **22** looking at a set criteria. No decisions are
 12:17:02 **23** made ahead of time. Nothing is -- well, I
 12:17:07 **24** believe it's that type of thing. That doesn't
 12:17:08 **25** happen.
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12:17:08 **1** **Q.** (By Mr. Chachkes) Let's start again. I'm
 12:17:10 **2** only asking questions about EDXA.
 12:17:12 **3** Can you agree with me not to answer about
 12:17:14 **4** TEM or SAED to the following sets of questions? I
 12:17:19 **5** just want to know how you do EDXA. Can you do that?
 12:17:24 **6** MR. CIRSCH: Object to form.
 12:17:25 **7** THE WITNESS: I've already explained that
 12:17:26 **8** to you.
 12:17:26 **9** **Q.** (By Mr. Chachkes) Okay. But can you
 12:17:27 **10** answer these following questions only referring to
 12:17:28 **11** EDXA? Can you do me that favor?
 12:17:30 **12** **A. No.**
 12:17:31 **13** **Q.** Okay.
 12:17:31 **14** **A. If I feel that the question needs more**
 12:17:33 **15** **explanation, an answer needs more explanation, I**
 12:17:36 **16** **believe that's my right.**
 12:17:37 **17** **Q.** Okay. You get the EDXA printout. At what
 12:17:40 **18** point, if at all, do you calculate the ratio of
 12:17:44 **19** metals to silicon for the EDXA?
 12:17:48 **20** MR. CIRSCH: Object to form.
 12:17:49 **21** THE WITNESS: I've already gone over that.
 12:17:50 **22** I can't say anything more.
 12:17:53 **23** If I'm sitting at the TEM, I'm looking at
 12:17:56 **24** the monitor and I'm determining -- and the
 12:17:59 **25** ratios come up fairly quick. We have them
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12:18:02 **1** tagged for silicon, magnesium, calcium, iron, or
 12:18:07 **2** whatever it happens to be, and the ratios are
 12:18:09 **3** fairly distinct compared to any other mineral
 12:18:11 **4** that I know out there, unless it's winchite or
 12:18:15 **5** richterite, and then we're looking at a little
 12:18:17 **6** bit of potassium or sodium.
 12:18:21 **7** **Q.** (By Mr. Chachkes) Okay. When you say the
 12:18:21 **8** ratios come up quick, do you mean a precise number
 12:18:23 **9** comes up on some screen?
 12:18:24 **10** **A. This ratio -- magnesium, silicon, calcium,**
 12:18:30 **11** **and iron -- is almost instantaneous. The only thing**
 12:18:33 **12** **that changes as you count, they all simultaneously**
 12:18:39 **13** **get higher. There is nothing else to it. You look**
 12:18:41 **14** **at that, you compare to the regulated standards, and**
 12:18:46 **15** **they all match.**
 12:18:47 **16** **Q.** Okay. Looking at Exhibit 12, tell me what
 12:18:50 **17** the ratios are there.
 12:18:54 **18** MR. CIRSCH: Object to form.
 12:18:55 **19** THE WITNESS: Say silicon is 10.
 12:18:59 **20** Magnesium and calcium is approximately 3. The
 12:19:05 **21** iron there would be less than 1.
 12:19:08 **22** **Q.** (By Mr. Chachkes) Okay. And that's how
 12:19:10 **23** you kind of do it in the real world when you're
 12:19:13 **24** analyzing EDXA spectra?
 12:19:16 **25** MR. CIRSCH: Object to form.
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12:19:16 **1** THE WITNESS: In the real world we have
 12:19:17 **2** standards, and after doing it thousands and
 12:19:20 **3** thousands of times, that's how it's done.
 12:19:24 **4** **Q.** (By Mr. Chachkes) Okay. Basically the
 12:19:25 **5** way you just did it, I'm putting aside that you may
 12:19:28 **6** have an encyclopedic knowledge of what to compare the
 12:19:31 **7** ratios to. You generate ratios the way you've just
 12:19:36 **8** done it, you look at it and you just read it and you
 12:19:39 **9** come up with the ratios?
 12:19:41 **10** MR. CIRSCH: Object to form.
 12:19:42 **11** THE WITNESS: I'm not generating ratios.
 12:19:44 **12** The tremolite fiber or bundle is generating the
 12:19:47 **13** ratios by the x-rays that are being generated
 12:19:51 **14** from the electron beam that are being counted at
 12:19:54 **15** specific energies. Those ratios are fairly
 12:19:57 **16** standard.
 12:19:58 **17** What I do is interpret the overall pattern
 12:20:02 **18** and determine how well it matches with the
 12:20:04 **19** tremolite standards that are in each of the TEM
 12:20:07 **20** rooms.
 12:20:07 **21** **Q.** (By Mr. Chachkes) That step in the EDXA
 12:20:11 **22** analysis where you determine the ratios, do you do it
 12:20:15 **23** in the real world like we just saw now, you look at
 12:20:22 **24** the spectra and you say, okay, silicon 10, magnesium,
 12:20:24 **25** calcium 3, iron 1-ish, is that how you do it in the
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12:20:26 **1** real world?

12:20:27 **2** MR. CIRSCH: Object to form.

12:20:28 **3** THE WITNESS: In the real world I don't --

12:20:31 **4** I look at the overall pattern, and the overall

12:20:35 **5** pattern is unique with the -- then it's an

12:20:39 **6** amphibole asbestos. And that's how every

12:20:43 **7** asbestos TEM lab in the country does it.

12:20:45 **8** Q. (By Mr. Chachkes) Okay. So does the

12:20:51 **9** ratios of metal to silicon in the EDXA analysis have

12:20:57 **10** a material impact on your conclusions about what

12:21:00 **11** you're looking at?

12:21:02 **12** MR. CIRSCH: Object to form.

12:21:03 **13** THE WITNESS: The elemental spectras

12:21:06 **14** always have a material impact on what I'm

12:21:08 **15** looking at in the EDXA.

12:21:10 **16** Q. (By Mr. Chachkes) I didn't ask about

12:21:11 **17** that. I asked about the specific ratio of metals to

12:21:15 **18** silicon.

12:21:16 **19** Does that particular numerical ratio have

12:21:20 **20** a material impact on how you conclude what you're

12:21:23 **21** looking at under the EDXA?

12:21:25 **22** MR. CIRSCH: Object to form.

12:21:26 **23** THE WITNESS: I don't understand the

12:21:27 **24** question. I think I've answered it over and

12:21:29 **25** over. I'll answer it one more time.

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12:21:32 **1** Q. (By Mr. Chachkes) No, no. I want to make

12:21:33 **2** sure you understand it.

12:21:34 **3** Do you understand what I mean by the ratio

12:21:36 **4** of metals to silicon; do you understand that?

12:21:39 **5** A. Yes, sir.

12:21:40 **6** Q. Okay. Do you calculate that number in

12:21:45 **7** your head, write it down, print it out? Do you

12:21:48 **8** calculate that number?

12:21:50 **9** MR. CIRSCH: Object to form.

12:21:51 **10** THE WITNESS: I don't know how I do it.

12:21:56 **11** Tremolite, the ratios to magnesium, silicon, and

12:22:00 **12** calcium are fairly unique. Not aware of any

12:22:03 **13** other fibrous materials that will have those

12:22:06 **14** specific ratios without some other additional

12:22:08 **15** elements such as aluminum and an amphibole

12:22:12 **16** diffraction pattern.

12:22:13 **17** Q. (By Mr. Chachkes) Okay. You keep

12:22:15 **18** answering a different question, but what I heard is

12:22:16 **19** that you don't calculate the ratio. You actually run

12:22:20 **20** the numbers and calculate the ratios of metal to

12:22:23 **21** silicon; is that correct? You don't run that number?

12:22:25 **22** MR. CIRSCH: Object to form.

12:22:26 **23** THE WITNESS: I look at -- when I'm doing

12:22:28 **24** this, I look at every pattern and compare it to

12:22:32 **25** the standard patterns for those three elements,

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12:22:35 **1** and then the iron depends on if we're going to

12:22:40 **2** call it actinolite or tremolite. That's how I

12:22:42 **3** do it.

12:22:43 **4** Q. (By Mr. Chachkes) Okay. Do you calculate

12:22:44 **5** the ratio of metals to silicon? Do you do that?

12:22:47 **6** MR. CIRSCH: Object to form.

12:22:49 **7** THE WITNESS: I think I've told you at

12:22:53 **8** least a half hour ago that I don't get a ruler

12:22:56 **9** out and measure each of the primary elements

12:22:58 **10** we're dealing with here, magnesium, silicon and

12:23:03 **11** calcium. I look at these distinct patterns,

12:23:06 **12** EDXA patterns, and can look at that and tell you

12:23:10 **13** that that is what matches for regulated

12:23:13 **14** tremolite asbestos.

12:23:14 **15** Q. (By Mr. Chachkes) Okay. Putting aside

12:23:15 **16** that you don't get a ruler out, do you kind of sort

12:23:20 **17** of estimate that ratio of metals to silicon in your

12:23:24 **18** head when you do this analysis?

12:23:25 **19** MR. CIRSCH: Alex, he's answered this

12:23:27 **20** question a number of times.

12:23:28 **21** MR. CHACHKES: No, he said he doesn't take

12:23:30 **22** out a ruler.

12:23:31 **23** MR. CIRSCH: A number of different times

12:23:32 **24** he's testified as to how he does the process.

12:23:34 **25** I'll let him answer it one more time and then

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1 I'm going to instruct him not to answer --

12:23:37 **2** MR. CHACHKES: You're at perfect liberty

12:23:38 **3** to shut the questions down at any point.

12:23:40 **4** MR. CIRSCH: I know. I'm going to let him

12:23:41 **5** do it one more time.

12:23:42 **6** MR. CHACHKES: Okay.

12:23:42 **7** Q. (By Mr. Chachkes) Do you estimate --

12:23:42 **8** putting aside whether you use a ruler or not to make

12:23:45 **9** it exact, do you estimate the ratio of metal to

12:23:48 **10** silicon in the EDXA spectra?

12:23:50 **11** A. For at least the tenth time, and my last

12:23:53 **12** time, when I generate a spectra of -- and I'll just

12:23:59 **13** call it right now suspected regulated tremolite, I

12:24:03 **14** look at the overall pattern for magnesium, silicon,

12:24:07 **15** and calcium and determine that it is consistent with

12:24:11 **16** the standards, and that's how I make that

12:24:14 **17** determination.

12:24:14 **18** Q. And is that overall pattern that you say

12:24:16 **19** you look at, is that the ratio of metals to silicon?

12:24:21 **20** A. I am not answering this question anymore.

12:24:24 **21** MR. CIRSCH: Object to form. That's it.

12:24:25 **22** Q. (By Mr. Chachkes) All right. So you will

12:24:26 **23** not answer that question?

12:24:28 **24** A. I've answered the question I'm estimating

12:24:31 **25** at least ten times.

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12:24:33 **1** Q. Okay. And you won't come back at some
 12:24:36 **2** point and say, yes, indeed, I calculate a number that
 12:24:41 **3** is the ratio of metals to silicon. You won't come
 12:24:43 **4** back and say that, will you?
 12:24:43 **5** MR. CIRSCH: Object to form.
 12:24:44 **6** Don't answer the question, Dr. Longo.
 12:24:45 **7** Move on, please, Counsel.
 12:24:47 **8** Q. (By Mr. Chachkes) Okay. Is the ratio of
 12:24:52 **9** metals to silicon for tremolite the same for every
 12:24:55 **10** EDXA printout?
 12:25:00 **11** A. I think I've already gone over it a couple
 12:25:04 **12** of times that depending on your detector, your EDXA
 12:25:08 **13** detector, if it is a silicon drifted, lithium drifted
 12:25:13 **14** window or windowless detector, these ratios will
 12:25:17 **15** change because it's more sensitive.
 12:25:19 **16** For example, for chrysotile, even though
 12:25:21 **17** there is more magnesium in the formula than silicon,
 12:25:28 **18** regular -- with a silicon window you will see less
 12:25:32 **19** magnesium. So it just depends on the EDS system.
 12:25:38 **20** We have both types. So you could see a
 12:25:40 **21** tremolite spectra from the windowless detector that
 12:25:45 **22** will look different than the other one as you're
 12:25:47 **23** getting ready to pull out.
 12:25:48 **24** Q. Are you aware that anthophyllite has a
 12:25:51 **25** ratio in the books published to be 7 to 8 for metals
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12:25:56 **1** to silicon? Are you aware of that?
 12:25:58 **2** MR. CIRSCH: Object to form.
 12:25:58 **3** THE WITNESS: I don't know. I would have
 12:25:59 **4** to look at it.
 12:26:00 **5** Q. (By Mr. Chachkes) Okay. And you're not
 12:26:02 **6** looking to see whether there's a ratio of 7 to 8
 12:26:05 **7** metals to silicon, are you?
 12:26:07 **8** MR. CIRSCH: Object to form.
 12:26:08 **9** THE WITNESS: For anthophyllite, we look
 12:26:10 **10** at the EDXA standards, typically the NIST
 12:26:16 **11** standards, for that pattern -- I've already told
 12:26:18 **12** you I don't get out a ruler and measure these --
 12:26:22 **13** that the spectra has to be consistent, and it
 12:26:25 **14** has to be for the type of EDXA detector you're
 12:26:29 **15** using.
 12:26:29 **16** Q. (By Mr. Chachkes) It's a very simple
 12:26:31 **17** question. Do you look for a 7 to 8 ratio metals to
 12:26:35 **18** silicon --
 12:26:35 **19** MR. CIRSCH: Object to form.
 12:26:36 **20** THE WITNESS: And it's a very simple
 12:26:38 **21** answer. We look at the standard NIST type
 12:26:40 **22** spectras that give you the patterns for
 12:26:42 **23** potentially anthophyllite or potentially fibrous
 12:26:46 **24** talc.
 12:26:48 **25** Q. (By Mr. Chachkes) Are you aware that
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12:26:49 **1** tremolite has a published ratio for EDXA metals to
 12:26:52 **2** silicon of 5-to-8?
 12:26:55 **3** MR. CIRSCH: Object to form.
 12:26:55 **4** THE WITNESS: Published where?
 12:26:57 **5** MR. CIRSCH: Yeah, will you show him the
 12:26:58 **6** document if your --
 12:26:59 **7** Q. (By Mr. Chachkes) Are you aware of any
 12:27:00 **8** publication that has that?
 12:27:01 **9** A. I don't know. Show me the publication and
 12:27:03 **10** I'll take a look at it, and I'll have to look at what
 12:27:07 **11** conditions this ratio is for what type of detector.
 12:27:11 **12** Q. Okay. So sitting here today, you can't
 12:27:14 **13** point me to a peer-reviewed publication that has
 12:27:17 **14** anything other than a 5-to-8 ratio for tremolite?
 12:27:24 **15** MR. CIRSCH: Object to form. You're
 12:27:26 **16** holding something in your hand. Why don't you
 12:27:28 **17** show --
 12:27:28 **18** THE WITNESS: I don't know. I'd have to
 12:27:29 **19** look at the publication. We look at the NIST
 12:27:31 **20** standards for determining if we have tremolite,
 12:27:34 **21** anthophyllite, anthophyllite solid solution
 12:27:37 **22** series, the tremolite solid solution series.
 12:27:39 **23** Q. (By Mr. Chachkes) Do the NIST standards
 12:27:41 **24** have ratios of metals to silicon?
 12:27:43 **25** A. The NIST -- as I think we already talked
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12:27:45 **1** about, I don't believe the NIST standards sends you
 12:27:47 **2** any information other than this is tremolite or this
 12:27:49 **3** is anthophyllite or this is actinolite or this is
 12:27:53 **4** crocidolite or this is amosite.
 12:27:54 **5** Q. Okay.
 12:27:54 **6** MR. CIRSCH: As soon as you get to a good
 12:27:56 **7** place, Alex, maybe we can take a lunch break.
 12:27:59 **8** MR. CHACHKES: Okay.
 12:27:59 **9** Q. (By Mr. Chachkes) Do you know what the
 12:27:59 **10** International Mineralogical Association is, the IMA?
 12:28:04 **11** A. I don't know.
 12:28:06 **12** Q. Okay. Are you aware -- so I guess you
 12:28:10 **13** wouldn't be aware they contain a comprehensive list
 12:28:14 **14** of minerals in their chemical formulas?
 12:28:16 **15** MR. CIRSCH: Object to form.
 12:28:17 **16** THE WITNESS: I'm sure they do.
 12:28:18 **17** Q. (By Mr. Chachkes) Have you ever looked at
 12:28:20 **18** that?
 12:28:20 **19** A. I don't know.
 12:28:29 **20** Q. Okay. So would you agree with the
 12:28:31 **21** statement that talc and anthophyllite have materially
 12:28:35 **22** similar chemistries so it can be difficult to
 12:28:38 **23** distinguish them on EDXA?
 12:28:41 **24** MR. CIRSCH: Object to form.
 12:28:42 **25** THE WITNESS: Yes and maybe.
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12:28:45 **1** Q. (By Mr. Chachkes) Okay. What part is
 12:28:46 **2** yes?
 12:28:47 **3** A. **Yes, they have similar chemical makeup.**
 12:28:50 **4** Q. And maybe they can be difficult to
 12:28:52 **5** distinguish on EDXA?
 12:28:53 **6** A. **Maybe, depending on the chemistry. But we**
 12:29:00 **7 don't distinguish fibrous talc from anthophyllite by**
 12:29:05 **8 just EDXA.**
 12:29:06 **9** Q. Okay. Am I correct that it can be
 12:29:09 **10** difficult under EDXA to distinguish anthophyllite
 12:29:14 **11** from talc?
 12:29:16 **12** MR. CIRSCH: Object to form.
 12:29:17 **13** THE WITNESS: I don't know about how
 12:29:18 **14** difficult or not difficult. It's not something
 12:29:20 **15** we do to distinguish anthophyllite from talc
 12:29:22 **16** just on the EDXA other than, okay, it has the
 12:29:25 **17** appropriate chemistry.
 12:29:28 **18** MR. CHACHKES: Okay. We can take a break
 12:29:32 **19** here. Lunchtime.
 12:29:33 **20** (Lunch recess from 12:29 p.m. to 1:35 p.m.)
 13:36:03 **21** Q. (By Mr. Chachkes) Dr. Longo, you had
 13:37:02 **22** mentioned before that you had looked at industrial
 13:37:05 **23** talc for asbestos; is that correct?
 13:37:06 **24** A. **Yes.**
 13:37:07 **25** Q. And for whom did you do that work?
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13:37:10 **1** A. **For whom? Which plaintiffs' attorney?**
 13:37:13 **2** Q. Sure.
 13:37:14 **3** A. **I don't recall.**
 13:37:18 **4** Q. For what client, company, did you do that
 13:37:20 **5** work?
 13:37:21 **6** A. **I haven't done any work for any client**
 13:37:29 **7 companies that I'm at liberty to talk about for**
 13:37:38 **8 industrial talc.**
 13:37:45 **9** Q. Okay. I'm just asking you yes or no, do
 13:37:48 **10** you remember the names of the companies or company?
 13:37:50 **11** A. **I can't talk about any potential work we**
 13:37:53 **12 may or may not have done for an industrial talc**
 13:37:56 **13 company.**
 13:37:56 **14** Q. No, this is just a yes or no. Do you
 13:37:58 **15** remember the name? I'm not asking for the name, just
 13:38:01 **16** do you remember the name?
 13:38:03 **17** A. **Again, I'm not saying I have or I haven't.**
 13:38:06 **18 I'm just not at liberty if I have and if no report**
 13:38:10 **19 has been issued, at liberty to talk about it.**
 13:38:13 **20** Q. Okay. You mentioned that you might have
 13:38:15 **21** looked at industrial talc for plaintiff lawyers. Was
 13:38:18 **22** that recent?
 13:38:19 **23** A. **I think the most recent one was back in**
 13:38:21 **24 2017 for the Kazan firm.**
 13:38:24 **25** Q. Okay. And you just don't know whether
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13:38:26 **1** that was associated with a particular company?
 13:38:30 **2** A. **Oh, the company, it was Nytal Vanderbilt**
 13:38:35 **3 talc.**
 13:38:35 **4** Q. Okay. But this is plaintiffs' side?
 13:38:39 **5** A. **Yes, sir.**
 13:38:39 **6** Q. What about the first time you ever looked
 13:38:43 **7** at industrial talc for asbestos, when was that?
 13:38:45 **8** A. **As I testified earlier, sometime in the**
 13:38:47 **9 1990s or early 2000s.**
 13:38:50 **10** Q. Was that one engagement? Multiple
 13:38:56 **11** engagements?
 13:38:57 **12** A. **I don't recall.**
 13:38:58 **13** Q. It could be one engagement; you just don't
 13:39:00 **14** remember?
 13:39:01 **15** A. **I'm sure it's more, but I just don't**
 13:39:02 **16 recall.**
 13:39:03 **17** Q. Greater than five? Less than five?
 13:39:05 **18** A. **I don't know what size bread box it is.**
 13:39:09 **19** Q. Okay. So you've established probably more
 13:39:12 **20** than one, but after that you can't say?
 13:39:14 **21** A. **I just don't recall.**
 13:39:15 **22** Q. Okay. What about more than one; you can
 13:39:17 **23** say it's more than one?
 13:39:19 **24** MR. CIRSCH: Object to form.
 13:39:20 **25** THE WITNESS: I believe so.
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13:39:21 **1** Q. (By Mr. Chachkes) Okay. And did you
 13:39:22 **2** personally do the TEM work on that?
 13:39:23 **3** A. **Back in those days, probably.**
 13:39:27 **4** Q. Did you do any -- personally do any PLM
 13:39:30 **5** work?
 13:39:30 **6** A. **No.**
 13:39:30 **7** Q. Personally do any XRD work?
 13:39:32 **8** A. **No.**
 13:39:32 **9** Q. Personally do any EDXA work?
 13:39:35 **10** A. **Well, when I do TEM for this type of work,**
 13:39:38 **11 I would have done EDXA.**
 13:39:40 **12** Q. Okay. Can you estimate in that engagement
 13:39:44 **13** or engagements in the 1990s, early 2000s range, how
 13:39:49 **14** many hours you would have spent?
 13:39:51 **15** A. **No.**
 13:39:52 **16** Q. Could be under ten; could be over ten?
 13:39:55 **17** A. **I don't recall.**
 13:39:56 **18** Q. You know who McCrone is; right?
 13:39:59 **19** A. **I do.**
 13:40:00 **20** Q. You know they have people there who teach
 13:40:02 **21** graduate courses related to detecting asbestos?
 13:40:05 **22** MR. CIRSCH: Object to form.
 13:40:06 **23** THE WITNESS: I know they have continuing
 13:40:10 **24** education courses, yes.
 13:40:11 **25** Q. (By Mr. Chachkes) Have you ever taught at
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13:40:12 1 a graduate school?

13:40:14 2 A. Not in this type of work, no.

13:40:16 3 Q. Okay. In what type of work?

13:40:19 4 A. Well, I was visiting assistant professor,

13:40:21 5 so it would have been materials science.

13:40:23 6 Q. Okay. Nothing to do with detecting

13:40:24 7 asbestos?

13:40:25 8 A. No.

13:40:25 9 Q. Do you know McCrone's Particle Atlas?

13:40:28 10 A. Yes.

13:40:28 11 Q. And that's something folks other than

13:40:31 12 McCrone use as a standard in this field?

13:40:36 13 A. Yes.

13:40:36 14 Q. Have you ever published anything that

13:40:39 15 other people outside of your lab use as a standard?

13:40:43 16 MR. CIRSCH: Object to form.

13:40:45 17 THE WITNESS: Not in a book, no.

13:40:47 18 Q. (By Mr. Chachkes) What about otherwise?

13:40:50 19 A. Yes, if you go to Federal Mogul's and

13:40:54 20 search for wollastonite detection, one of our

13:40:58 21 protocols was published by them for the determination

13:41:02 22 of tremolite asbestos in wollastonite for Federal

13:41:07 23 Mogul involving their manufacture of OEM brakes.

13:41:11 24 Q. What is Federal Mogul? I'm not familiar

13:41:12 25 with that.

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13:41:12 1 A. It's a company that owns a bunch of

13:41:14 2 companies.

13:41:14 3 Q. Okay. So you published -- I'm sorry, say

13:41:20 4 it again. What does it stand for?

13:41:22 5 A. Well, I didn't publish it. We wrote a

13:41:25 6 protocol for determining a problem they were having

13:41:29 7 with the supplier of a mineral called wollastonite,

13:41:29 8 which is a substitute fibrous material, and the

13:41:31 9 particular source that they were using stated that it

13:41:36 10 had a small amount of tremolite contamination in it.

13:41:38 11 Q. Okay. Did you ever published a standard

13:41:40 12 for finding asbestos that was for the general

13:41:44 13 scientific community, not for just one specific

13:41:49 14 client?

13:41:49 15 MR. CIRSCH: Object to form.

13:41:50 16 THE WITNESS: I was in charge of the ASTM

13:41:52 17 and the D2205 committee for the analysis of --

13:41:57 18 number count analysis of asbestos in settled

13:42:01 19 dust. It's the D5755, I believe it is.

13:42:05 20 Q. (By Mr. Chachkes) Okay. And that has

13:42:08 21 your name on it?

13:42:09 22 A. No. ASTM standards have ASTM on it.

13:42:13 23 Q. Okay. And that was -- that standard --

13:42:16 24 the contributors were many more people than you;

13:42:16 25 right?

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13:42:19 1 A. Yes. Some people contributed, but I was

13:42:22 2 in charge of -- it was our method that we had given

13:42:25 3 to the EPA. Then it was fighting over the

13:42:30 4 definitions.

13:42:31 5 Q. Have you or MAS published any standard for

13:42:35 6 finding asbestos in any material or any mineral or

13:42:39 7 anywhere that is attributable exclusively to you or

13:42:43 8 MAS?

13:42:43 9 A. No.

13:42:44 10 Q. Have you published a methodology for

13:42:55 11 finding asbestos in talc?

13:42:57 12 A. Have not.

13:42:59 13 Q. You're aware that McCrone has done that;

13:43:01 14 right?

13:43:01 15 MR. CIRSCH: Object to form.

13:43:02 16 THE WITNESS: Jim Millette, yes, I'm

13:43:05 17 aware, 1990 and 2015, I believe, are the two

13:43:09 18 papers in Microscopy.

13:43:10 19 Q. (By Mr. Chachkes) You're aware that

13:43:11 20 McCrone has testing and training classes related to

13:43:14 21 finding asbestos; correct?

13:43:15 22 MR. CIRSCH: Object to form.

13:43:16 23 THE WITNESS: They teach a -- used to,

13:43:19 24 anyway, the McCrone Institute. May still do it.

13:43:25 25 Q. (By Mr. Chachkes) Have you ever taught or

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13:43:30 1 trained -- sponsored teaching or training classes for

13:43:34 2 finding asbestos for people outside of MAS?

13:43:36 3 A. I've given a couple lectures and taught an

13:43:39 4 all-day two-day seminar at the American Industrial

13:43:44 5 Hygiene Association to help train, to give certified

13:43:48 6 industrial hygienists or industrial hygienists how to

13:43:51 7 perform TEM analysis for asbestos.

13:43:54 8 Q. Okay. Other than that, any?

13:43:57 9 A. At Georgia Tech in their continuing

13:44:00 10 education program involving asbestos, seminar up at

13:44:08 11 Southern University of New York, I have taught there

13:44:13 12 for a week. Again, it was TEM analysis for asbestos.

13:44:19 13 Q. Okay. Was it for finding talc, asbestos

13:44:24 14 in talc?

13:44:25 15 A. No, it was just general finding asbestos

13:44:28 16 in whatever you wanted to look in.

13:44:30 17 Q. Have you or MAS given any training or

13:44:36 18 classes relating to finding asbestos in talc?

13:44:39 19 A. No.

13:44:39 20 Q. Has any School of Public Health asked you

13:44:43 21 to assist them in finding asbestos in talc?

13:44:46 22 A. No.

13:44:47 23 Q. You're aware that a number of governmental

13:44:51 24 bodies are out there, not just in the U.S. but

13:44:54 25 elsewhere, looking into the question of whether

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13:44:58 **1** asbestos is in cosmetic talc; correct?

13:45:01 **2** MR. CIRSCH: Object to form.

13:45:02 **3** THE WITNESS: I'm aware of Canada and

13:45:06 **4** maybe India, maybe. I've seen some articles.

13:45:07 **5** **Q.** (By Mr. Chachkes) Okay. Have any of

13:45:07 **6** those -- any governmental body, U.S. or otherwise,

13:45:10 **7** asked you to assist in determining whether cosmetic

13:45:13 **8** talc has asbestos?

13:45:15 **9** MR. CIRSCH: Object to form.

13:45:16 **10** THE WITNESS: No.

13:45:18 **11** **Q.** (By Mr. Chachkes) Has any federal court

13:45:20 **12** ever said that your methodology for finding talc

13:45:23 **13** in -- asbestos in talc passes Daubert standards?

13:45:30 **14** **A.** I'm not sure I've had a Daubert standard

13:45:32 **15** in federal court yet. As for state court, I think

13:45:36 **16** there's been seven, six or seven challenges.

13:45:39 **17** **Q.** So my question is about federal court.

13:45:41 **18** Has any federal court certified you under Daubert

13:45:43 **19** standards for finding asbestos in talc?

13:45:45 **20** MR. CIRSCH: Object to form.

13:45:46 **21** THE WITNESS: As I just stated, I don't

13:45:48 **22** believe I've been in federal court yet other

13:45:50 **23** than this one for -- where any Daubert

13:45:56 **24** challenges would arise.

13:45:57 **25** **Q.** (By Mr. Chachkes) Has your methodology

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13:45:59 **1** for finding asbestos in talc ever been published in a

13:46:04 **2** peer-review journal or literature otherwise?

13:46:05 **3** MR. CIRSCH: Object to form.

13:46:06 **4** THE WITNESS: Well, it's not my method,

13:46:08 **5** and the Blount method by PLM has been published

13:46:13 **6** and the ISO 22262-2 is an international

13:46:16 **7** standard. So it's not my method; it's standard

13:46:20 **8** protocols for doing the method.

13:46:21 **9** **Q.** (By Mr. Chachkes) Is all your analysis

13:46:23 **10** for -- all your analysis of cosmetic talc for

13:46:27 **11** asbestos been for and sponsored by plaintiffs'

13:46:30 **12** lawyers?

13:46:31 **13** **A.** Yes.

13:46:31 **14** **Q.** You mentioned the NVLA. What is that?

13:46:36 **15** **A.** National Voluntary Laboratory

13:46:41 **16** Accreditation Program for the determination of

13:46:42 **17** asbestos in air samples by TEM and bulk analysis.

13:46:47 **18** **Q.** Does the NVLA have an accreditation for

13:46:52 **19** finding asbestos in talc?

13:46:54 **20** **A.** It's hard to say because they don't really

13:47:01 **21** dictate what the matrix is.

13:47:04 **22** **Q.** When you say matrix, what do you mean by

13:47:06 **23** that?

13:47:06 **24** **A.** Well, it's just asbestos in materials.

13:47:09 **25** I'm not sure they have a specific one for talc or a

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13:47:13 **1** specific one for joint compound or a specific one for

13:47:17 **2** thermal insulation. It's just a matter of being able

13:47:23 **3** to determine and detect and to record what is

13:47:27 **4** present.

13:47:28 **5** **Q.** Okay. Does the NVLA have an accreditation

13:47:33 **6** standard for finding talc in something other than

13:47:36 **7** air, like in -- I'm sorry, strike that.

13:47:37 **8** Does the NVLA have an accreditation

13:47:41 **9** standard for finding asbestos in something other than

13:47:43 **10** air, like in talc?

13:47:44 **11** MR. CIRSCH: Object to form.

13:47:45 **12** THE WITNESS: Well, they accredited to the

13:47:48 **13** EPA 600/R-93 PLM method. That's not specific

13:47:53 **14** for talc. It's building materials.

13:47:56 **15** **Q.** (By Mr. Chachkes) And do they accredit

13:47:58 **16** you for methodology or something else?

13:48:01 **17** **A.** To be able to perform the analysis.

13:48:04 **18** **Q.** Meaning what?

13:48:06 **19** **A.** Meaning if you -- we have round-robins

13:48:10 **20** that you can adequately identify products that have a

13:48:14 **21** certain concentration of asbestos in it that you

13:48:16 **22** would routinely see for building products.

13:48:18 **23** **Q.** Has NVLA ever accredited you specifically

13:48:21 **24** for finding talc in asbestos?

13:48:24 **25** **A.** I think, as I've already stated, they

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13:48:26 **1** don't have a previous matrix, meaning what is the

13:48:29 **2** asbestos in. They go by the EPA 600/R-93 method for

13:48:36 **3** analysis of bulk samples, typically building material

13:48:40 **4** bulk samples for asbestos.

13:48:41 **5** **Q.** So the NVLA, did they actually have

13:48:44 **6** someone come to your lab and do this accreditation?

13:48:46 **7** **A.** Yes.

13:48:46 **8** **Q.** Okay. When that person came to your lab

13:48:47 **9** for the accreditation, did they ask to see your

13:48:51 **10** techniques and methodologies for finding asbestos in

13:48:53 **11** talc?

13:48:54 **12** MR. CIRSCH: Object to form.

13:48:55 **13** THE WITNESS: Again, they don't say talc

13:48:57 **14** and they don't say any particular thing. It's

13:48:58 **15** just your overall methodology for performing the

13:49:01 **16** analysis. And usually the auditor will bring

13:49:07 **17** samples and have the analyst be able to

13:49:10 **18** determine the type and the estimated weight

13:49:14 **19** percent of what's in the sample.

13:49:15 **20** **Q.** (By Mr. Chachkes) Okay. So the samples

13:49:18 **21** that the NVLA brought for you to analyze for your

13:49:22 **22** accreditation were not talc samples; correct?

13:49:25 **23** **A.** I don't believe so, no.

13:49:25 **24** **Q.** They were just straight-up samples of

13:49:28 **25** different kinds of asbestos; right?

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13:49:30 **1 A. In some building material.**
 13:49:32 **2 Q.** Okay. Is the NVLA accreditation standard
 13:49:38 **3** public?
 13:49:39 **4 A. When you -- I don't understand what you**
 13:49:40 **5 mean.**
 13:49:40 **6 Q.** Obviously, they must have some standard
 13:49:42 **7** that they're comparing you to. Is that written down,
 13:49:44 **8** or is it just in the minds of the NVLA?
 13:49:49 **9** MR. CIRSCH: Form.
 13:49:50 **10** THE WITNESS: I mean, there is a set this
 13:49:50 **11** is what you have to do and be able to do, plus
 13:49:54 **12** the PAT rounds that's sent out by the Research
 13:50:02 **13** Triangle Institute where they send samples out,
 13:50:05 **14** your analysts have to analyze them and send them
 13:50:08 **15** in, and they compare to see if you pass or fail.
 13:50:10 **16 Q.** (By Mr. Chachkes) Okay. My question was
 13:50:14 **17** do they have published standards?
 13:50:16 **18** MR. CIRSCH: Object to form.
 13:50:17 **19 Q.** (By Mr. Chachkes) Something written down
 13:50:17 **20** where I can look at it and read on the page, ah, this
 13:50:20 **21** is how they accredit me?
 13:50:22 **22** MR. CIRSCH: Object to form.
 13:50:23 **23** THE WITNESS: I think you can go to the
 13:50:24 **24** NIST website for this type of -- and download
 13:50:29 **25** it. I'm sure it's public.
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13:50:32 **1 Q.** (By Mr. Chachkes) Now, you've run NIST
 13:50:36 **2** standards for EDSA; correct?
 13:50:39 **3 A. Correct.**
 13:50:39 **4 Q.** How often do you run those?
 13:50:43 **5 A. I think you asked me earlier. I don't**
 13:50:45 **6 recall. I brought some here because since we were**
 13:50:48 **7 looking at the EDXA or talking about EDXA of**
 13:50:53 **8 tremolite, it's in my reliance documents where we**
 13:50:56 **9 measured the EDXA on 200 tremolite fibers and bundles**
 13:51:02 **10 showing you the, quote, pattern.**
 13:51:06 **11 Q.** I'm sorry, you're talking about the NIST
 13:51:08 **12** standard right now?
 13:51:08 **13 A. Yes.**
 13:51:09 **14 Q.** Okay. So you analyzed 200 NIST standards?
 13:51:11 **15 A. Well, 200 particles in a NIST standard.**
 13:51:13 **16 Q.** Okay. So you've at least done one NIST
 13:51:16 **17** standard. Have you done more than one NIST standard?
 13:51:19 **18 A. We have analyzed all the NIST standards to**
 13:51:26 **19 generate standards of EDXA.**
 13:51:29 **20 Q.** Same for SAED?
 13:51:31 **21 A. Yes.**
 13:51:32 **22 Q.** Same for TEM?
 13:51:35 **23 A. Well, TEM would be EDXA and SAED.**
 13:51:39 **24 Q.** Okay. And do you keep those materials,
 13:51:45 **25** the standards you run?
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13:51:46 **1 A. I believe so.**
 13:51:47 **2 Q.** Okay. And you said you brought something.
 13:51:49 **3** What did you bring?
 13:51:50 **4 A. Well, I brought the EDXA on 200 tremolite**
 13:51:55 **5 fibers and bundles that was done, the 1867.**
 13:52:01 **6 Q.** Oh, I'm sorry, so this is something you've
 13:52:04 **7** already produced; you just brought it -- also brought
 13:52:05 **8** it?
 13:52:06 **9 A. Yes.**
 13:52:06 **10 Q.** Okay.
 13:52:06 **11 A. I mean, it's in my reliance documents, and**
 13:52:08 **12 it can give you a -- if you look at the ratios,**
 13:52:14 **13 they're pretty much identical to what you were**
 13:52:16 **14 showing me here.**
 13:52:17 **15 Q.** Okay. And did you bring any other
 13:52:25 **16** documents that haven't been produced?
 13:52:27 **17** Did you bring any documents that haven't
 13:52:28 **18** been produced?
 13:52:29 **19 A. Well, these have been produced.**
 13:52:31 **20 Q.** Right. So I'm asking separate and apart
 13:52:33 **21** from that.
 13:52:33 **22 A. Oh.**
 13:52:34 **23 Q.** Did you bring any documents today that
 13:52:35 **24** haven't been produced?
 13:52:36 **25 A. No.**
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13:52:36 **1 Q.** Okay. So those are your NIST samples for
 13:52:45 **2** EDXA; right?
 13:52:47 **3 A. Right. We were looking at the**
 13:52:48 **4 Addison-Davies method to see if boiling the acid --**
 13:52:52 **5 boiling the tremolite in sulfuric acid for an hour**
 13:52:56 **6 and then boiling it in sodium hydroxide for an hour,**
 13:53:00 **7 did it change any chemical component or size**
 13:53:03 **8 distribution of the NIST standard.**
 13:53:05 **9 Q.** Did you produce your NIST standard
 13:53:07 **10** analysis for TEM?
 13:53:11 **11 A. That is TEM.**
 13:53:11 **12 Q.** Okay. All right. For what about PLM, did
 13:53:15 **13** you produce those?
 13:53:16 **14 A. No.**
 13:53:16 **15** MR. CIRSCH: Object to form.
 13:53:18 **16** THE WITNESS: You typically -- since it's
 13:53:21 **17** almost 100 percent tremolite, it's not usually a
 13:53:23 **18** standard that you develop for PLM. You can look
 13:53:25 **19** at it and check your refractive indices and make
 13:53:30 **20** sure -- the oblique extinction, et cetera, but
 13:53:34 **21** you don't usually just run those.
 13:53:36 **22 Q.** (By Mr. Chachkes) Okay. So when you say
 13:53:37 **23** you don't usually, you did not run NIST standards for
 13:53:40 **24** PLM; is that what I'm hearing?
 13:53:42 **25 A. I don't know if we have. I don't believe**
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13:53:44 **1 so.**
 13:53:44 **2 Q.** Okay. If you did, would you have kept the
 13:53:47 **3** material?
 13:53:48 **4** MR. CIRSCH: Object to form.
 13:53:49 **5** THE WITNESS: I don't know.
 13:53:50 **6 Q.** (By Mr. Chachkes) Okay. We would ask any
 13:53:51 **7** of that material be produced.
 13:53:54 **8** Any other NIST standards that you ran
 13:53:57 **9** under any other instruments that we haven't talked
 13:53:59 **10** about?
 13:53:59 **11 A. No.**
 13:54:14 **12** MS. TROVATO: I'm sorry, I have Exhibit 10
 13:54:15 **13** to this deposition --
 13:54:16 **14** MR. CIRSCH: That's been marked at a
 13:54:18 **15** previous deposition.
 13:54:18 **16** THE WITNESS: That was marked on 3/21.
 13:54:18 **17** MS. TROVATO: I want to mark it here.
 13:54:21 **18** MR. CHACHKES: Okay. Can we mark this as
 13:54:22 **19** Exhibit 14.
 13:54:24 **20** (Defendants' Exhibit 14 was marked for
 13:54:33 **21** identification.)
 13:54:33 **22 Q.** (By Mr. Chachkes) Okay. So Exhibit 14 is
 13:54:34 **23** what you were just referring to as the -- you ran a
 13:54:37 **24** NIST standard and the Addison-Davies technique,
 13:54:39 **25** that's 14; right?
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13:54:40 **1 A. Yes, sir.**
 13:54:40 **2 Q.** Okay. Looking back at -- can you go back
 13:54:46 **3** to Exhibit 12, which is the EDXA spectrum.
 13:54:54 **4** If I handed this to a very experienced
 13:55:00 **5** EDXA scientist, as experienced as you want, and I
 13:55:06 **6** gave him no context where it came from, you know,
 13:55:12 **7** anything other than just this printout, would they
 13:55:14 **8** identify this as tremolite and only tremolite?
 13:55:17 **9** MR. CIRSCH: Object to form.
 13:55:18 **10** THE WITNESS: I can't opine about what
 13:55:20 **11** other people would do. If I looked at this, my
 13:55:24 **12** reaction would be that looks like tremolite.
 13:55:27 **13 Q.** (By Mr. Chachkes) Okay. I'm not talking
 13:55:28 **14** about you. Again, this is about the question of what
 13:55:32 **15** a third-party would and how they would interpret
 13:55:37 **16** this.
 13:55:37 **17** Would somebody who is a very experienced
 13:55:39 **18** EDSA scientist look at this spectra and say I know
 13:55:47 **19** what this is, this is tremolite? Or are there other
 13:55:50 **20** minerals that are consistent with this?
 13:55:53 **21** MR. CIRSCH: Object to form.
 13:55:54 **22** THE WITNESS: I can't speculate on what
 13:55:55 **23** other experienced TEM folks would do. I can
 13:55:58 **24** just tell you, since I'm sitting here, that I
 13:56:02 **25** would say that's probably tremolite.
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13:56:04 **1 Q.** (By Mr. Chachkes) Okay. Again, I know
 13:56:05 **2** what you think. So these questions aren't about what
 13:56:08 **3** you think.
 13:56:09 **4** Do you think a third-party scientist
 13:56:11 **5** looking at Exhibit 12, without knowing context, just
 13:56:15 **6** looking at what's in Exhibit 12, this EDSA spectrum,
 13:56:18 **7** might say that also corresponds to minerals that
 13:56:23 **8** aren't tremolite?
 13:56:25 **9** MR. CIRSCH: Object to form. He's already
 13:56:26 **10** answered the question. It calls for
 13:56:28 **11** speculation.
 13:56:28 **12** THE WITNESS: I can't speculate what other
 13:56:30 **13** experienced microscopists would say that is.
 13:56:34 **14 Q.** (By Mr. Chachkes) Okay. And so you can't
 13:56:36 **15** testify to a reasonable degree of scientific
 13:56:39 **16** certainty that this EDSA pattern in a vacuum can only
 13:56:46 **17** correspond to a single mineral and only that mineral
 13:56:50 **18** tremolite?
 13:56:50 **19** MR. CIRSCH: Object to form.
 13:56:52 **20** THE WITNESS: Within a reasonable degree
 13:56:56 **21** of scientific certainty, if I looked at this
 13:56:57 **22** mineral, I would say that looks like tremolite.
 13:56:59 **23 Q.** (By Mr. Chachkes) So I'm not asking about
 13:57:00 **24** you. I'm asking -- this is a question about
 13:57:02 **25** reproducibility, that if some other scientist looked
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13:57:06 **1** at this, not you, okay, that are you testifying that
 13:57:12 **2** within a reasonable degree of scientific certainty
 13:57:15 **3** that this pattern can only correspond to tremolite?
 13:57:20 **4** MR. CIRSCH: Object to form.
 13:57:21 **5** THE WITNESS: I can't speculate what other
 13:57:22 **6** scientists -- and they wouldn't be much of a
 13:57:25 **7** scientist if they were going to look at this in
 13:57:28 **8** a vacuum and then make some judgment on it
 13:57:31 **9** without sitting at the TEM.
 13:57:32 **10** If another very experienced scientist was
 13:57:34 **11** sitting at a TEM looking at the counting rules
 13:57:39 **12** and it's a regulated asbestos, he would most
 13:57:42 **13** likely have some information about where it came
 13:57:45 **14** from --
 13:57:45 **15 Q.** (By Mr. Chachkes) Okay. So the counting
 13:57:46 **16** rules, how do they apply to Exhibit 12, the EDSA?
 13:57:49 **17 A. Well, again, you cut me off. What I'm**
 13:57:53 **18 saying is I don't believe it would be a very -- that**
 13:57:56 **19 it's very scientific to sit in a vacuum and not know**
 13:58:00 **20 anything about anything and look at this, and how am**
 13:58:04 **21 I supposed to know what some other experienced**
 13:58:06 **22 scientist is going to say or do?**
 13:58:07 **23 Q.** Okay. I'll represent to you I've shown
 13:58:10 **24** this, what's in Exhibit 12, to a very experienced
 13:58:15 **25** mineralogist who also does EDXA work, and that
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13:58:19 1 person's confirmed that this is not a unique pattern
 13:58:22 2 for tremolite, that there are other minerals that
 13:58:24 3 correspond.
 13:58:25 4 Sitting here today, do you have anything
 13:58:26 5 to provide me that disputes that?
 13:58:28 6 MR. CIRSCH: Object to form. I mean, how
 13:58:30 7 can he possibly testify to that?
 13:58:36 8 MR. CHACHKES: I mean, limit the speaking
 13:58:37 9 objections, please.
 13:58:38 10 THE WITNESS: It's EDXA. This came off a
 13:58:41 11 tremolite fiber bundle that we verified, that in
 13:58:45 12 the matrix that this came out of, it's well
 13:58:48 13 established that those type of amphiboles are
 13:58:50 14 formed.
 13:58:52 15 What some other expert or experienced
 13:58:57 16 microscopist is saying that it's going to be
 13:59:00 17 confused with some other minerals, I can't
 13:59:02 18 comment on it. If you'd like to tell me what
 13:59:05 19 those minerals are, I could certainly look and
 13:59:08 20 see if there's -- (cell phone rings.)
 13:59:10 21 Is that me? I'm sorry. It's not supposed
 13:59:16 22 to be on. I apologize.
 13:59:24 23 Q. (By Mr. Chachkes) What work have you done
 13:59:28 24 to survey the world of minerals to determine what
 13:59:36 25 other minerals other than regulated asbestos could
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13:59:40 1 have EDSA patterns that correspond to what I'm
 13:59:46 2 looking at in Exhibit 12?
 13:59:47 3 MR. CIRSCH: Object to form.
 13:59:48 4 THE WITNESS: I've looked at all the
 13:59:49 5 potential look-alikes, and again, you just can't
 13:59:53 6 do an EDS pattern without looking at the
 13:59:56 7 structure. Some -- and I've looked at every one
 13:59:59 8 that Sanchez says that could be look-alikes, and
 14:00:06 9 a number of them are not fibrous and a lot of
 14:00:09 10 them have aluminum in it. So I'm not concerned
 14:00:13 11 that this is anything but tremolite asbestos.
 14:00:18 12 Q. (By Mr. Chachkes) Did you look at any
 14:00:25 13 databases to compare this spectra to what the
 14:00:28 14 databases say are the things that have similar EDSA
 14:00:33 15 patterns?
 14:00:33 16 MR. CIRSCH: Object to form.
 14:00:34 17 THE WITNESS: No, I didn't look at any
 14:00:37 18 databases. This was done in regards to the
 14:00:39 19 typical TEM protocols for identifying asbestos.
 14:00:42 20 I'm not aware of any other minerals with all the
 14:00:46 21 characteristics of both being fibrous, meaning
 14:00:48 22 the counting definition, the amphibole
 14:00:54 23 diffraction pattern for the d-spacings. This is
 14:00:57 24 not misidentified.
 14:00:59 25 Q. (By Mr. Chachkes) Okay. Did you look
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14:01:00 1 at -- and I'm just talking about the EDSA now, I'm
 14:01:03 2 not talking about counting or things that aren't the
 14:01:06 3 EDSA -- I'm sorry. EDXA. Let me start that again.
 14:01:11 4 I'm talking about just the EDXA now, not
 14:01:15 5 talking about other methods of identifying what
 14:01:17 6 you're looking at. Did you look at any textbook or
 14:01:21 7 peer-reviewed literature to see what this pattern
 14:01:27 8 could also -- in Exhibit 12 -- could also correspond
 14:01:30 9 to?
 14:01:30 10 MR. CIRSCH: Object to form.
 14:01:31 11 THE WITNESS: It doesn't correspond -- and
 14:01:32 12 you're --
 14:01:33 13 Q. (By Mr. Chachkes) The question is what
 14:01:34 14 you looked at.
 14:01:34 15 A. Please don't interrupt.
 14:01:37 16 MR. CIRSCH: Let him answer the question,
 14:01:38 17 please.
 14:01:39 18 THE WITNESS: You're trying to do this in
 14:01:40 19 a vacuum. Here's just an EDS pattern, I'm not
 14:01:42 20 going to give you any other information, I'm not
 14:01:43 21 going to let you look at what kind of -- it's a
 14:01:45 22 fibrous structure or it's a particulate. Not
 14:01:46 23 going to let you look at the SAED patterns.
 14:01:50 24 It's not following the procedure we've
 14:01:52 25 used here for all these samples. So I can't
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14:01:55 1 comment on something that I wouldn't do as an
 14:01:58 2 expert coming in here just looking at an EDS
 14:02:01 3 pattern with -- EDXA pattern without any other
 14:02:04 4 information.
 14:02:04 5 Q. (By Mr. Chachkes) Okay. So am I correct
 14:02:06 6 that your answer is no, you did not look at a
 14:02:09 7 textbook or peer-reviewed literature to determine
 14:02:11 8 what this EDSA pattern could also correspond to other
 14:02:15 9 than what you believe to be tremolite?
 14:02:16 10 MR. CIRSCH: Object to form.
 14:02:17 11 THE WITNESS: No. I wouldn't just take an
 14:02:19 12 EDS pattern by itself and then run it to see
 14:02:23 13 what other possible minerals in the world have
 14:02:26 14 the same elements.
 14:02:27 15 I would only be testifying here that this
 14:02:29 16 is tremolite -- regulated tremolite asbestos
 14:02:33 17 based on the entirety of the analysis that's
 14:02:35 18 done for each of these fibers or bundles.
 14:02:37 19 Q. (By Mr. Chachkes) Okay. Let's talk about
 14:02:39 20 SAED for a moment. You did SAED pattern analysis?
 14:02:43 21 A. Yes.
 14:02:43 22 Q. Okay. Would you agree that the more
 14:02:49 23 complete the SAED pattern an analyst obtains, the
 14:02:52 24 more likely the analyst is to make an accurate
 14:02:55 25 determination of the crystal structure?
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14:02:56 **1** MR. CIRSCH: Object to form.

14:02:58 **2** THE WITNESS: No.

14:02:59 **3** Q. (By Mr. Chachkes) Why not?

14:02:59 **4** A. **For tremolite you just need the**

14:03:03 **5 d-spacings. For anthophyllite, you just need to --**

14:03:07 **6 if it has anything close to the reflection or the**

14:03:09 **7 crystal orientation of fibrous talc, you just need to**

14:03:12 **8 turn it to make sure that the amphibole pattern comes**

14:03:16 **9 up. You don't need to do anything more to adequately**

14:03:20 **10 identify if it's anthophyllite versus fibrous talc or**

14:03:25 **11 anthophyllite solid solution series.**

14:03:28 **12** Q. Okay. Is streaking in your SAED pattern

14:03:32 **13** something that can get in the way of an accurate

14:03:35 **14** determination?

14:03:35 **15** A. **It depends on what type of asbestos it is.**

14:03:38 **16 If you're seeing streaking and you have the right**

14:03:41 **17 chemistry and it's tubular, then it's chrysotile.**

14:03:44 **18 But we don't see the streaking that's getting -- that**

14:03:47 **19 you say is getting in the way to adequately look at**

14:03:50 **20 these diffraction patterns.**

14:03:51 **21** Q. If the dots on an SAED pattern are out of

14:03:56 **22** focus, does that affect the accuracy in your

14:03:59 **23** determining the crystal structure?

14:03:59 **24** A. **Depends what you mean by out of focus. As**

14:04:01 **25 long as you have the particular planes of dots, how**

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14:04:04 **1 focused or out of focus it is sometimes doesn't**

14:04:07 **2 matter. If it's way out of focus, yes, it would.**

14:04:09 **3** Q. Would you agree that it's important to --

14:04:12 **4** strike that.

14:04:13 **5** Would you agree that the further out you

14:04:21 **6** have complete dots in the pattern and the more

14:04:23 **7** focused the image it is, the easier it is for the

14:04:26 **8** analyst to study the crystal structure?

14:04:28 **9** MR. CIRSCH: Object to form.

14:04:29 **10** THE WITNESS: It depends.

14:04:32 **11** Q. (By Mr. Chachkes) What does it depend on?

14:04:34 **12** A. **Well, I have to get some examples and I**

14:04:37 **13 can show you. You know, the patterns we have taken**

14:04:41 **14 have been adequate for the analyst, plus the EDXA**

14:04:45 **15 plus the fibrous nature to identify appropriately if**

14:04:49 **16 it's -- typically what we're seeing is either the**

14:04:52 **17 tremolite solid solution series, more tremolite than**

14:04:56 **18 winchite or richterite or actinolite, and**

14:04:59 **19 anthophyllite solid solution series. We don't take**

14:05:02 **20 it any further than that.**

14:05:02 **21** Q. So you testified that to determine whether

14:05:04 **22** something is tremolite, you just need to know the

14:05:07 **23** d-spacing; correct?

14:05:08 **24** MR. CIRSCH: Object to form.

14:05:09 **25** THE WITNESS: And the EDXA as well as

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14:05:11 **1** the -- if it is fibrous or not. That's all you

14:05:16 **2** need.

14:05:16 **3** Q. (By Mr. Chachkes) Okay.

14:05:17 **4** A. **And that's all NVLAP requires.**

14:05:21 **5** Q. Okay. And that's expressly written in the

14:05:25 **6** NVLA standard?

14:05:28 **7** A. **I don't know if it's expressly written,**

14:05:30 **8 but it's not required for any of the audits that we**

14:05:33 **9 have, zone axis patterns for tremolite or any**

14:05:37 **10 regulated asbestos.**

14:05:37 **11** Q. Okay. So your opinion is that good

14:05:39 **12** science is determined by whether something passes

14:05:42 **13** NVLA accreditation?

14:05:43 **14** MR. CIRSCH: Object to form.

14:05:44 **15** THE WITNESS: It is good science. I don't

14:05:48 **16** know what good science mean. I mean, versus bad

14:05:50 **17** science?

14:05:51 **18** NVLAP is coming in to determine that if

14:05:55 **19** somebody sends you an air sample that you can

14:05:57 **20** adequately identify, or bulk sample, identify

14:06:01 **21** the asbestos to the degree that you're not

14:06:02 **22** letting people walk into an environment where

14:06:04 **23** they're getting exposed to asbestos.

14:06:07 **24** We go to the -- so that we perform the

14:06:11 **25** necessary analytical techniques for each of

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14:06:14 **1** these methods to positively affirm or deny that

14:06:19 **2** there's any detectable asbestos present.

14:06:21 **3** Q. (By Mr. Chachkes) Does the NVLA have in

14:06:23 **4** it an example of d-spacing that corresponds to

14:06:27 **5** tremolite?

14:06:29 **6** MR. CIRSCH: Object to the form.

14:06:30 **7** THE WITNESS: I believe so.

14:06:31 **8** Q. (By Mr. Chachkes) Okay. And we'd find

14:06:34 **9** that on their website?

14:06:35 **10** MR. CIRSCH: Object to form.

14:06:36 **11** THE WITNESS: I think so.

14:06:37 **12** Q. (By Mr. Chachkes) Okay. And then you

14:06:38 **13** said for anthophyllite, what do you need, again?

14:06:40 **14** A. **For us, anthophyllite, we just make sure**

14:06:44 **15 it's not fibrous talc, since we're looking at talc**

14:06:50 **16 samples. And that the anthophyllite chemistry, the**

14:06:55 **17 anthophyllite solid solution chemistry is**

14:06:57 **18 appropriate, what we typically see is, because we're**

14:07:00 **19 using heavy density liquid primarily, I think, all**

14:07:03 **20 here, all with what I call iron-rich.**

14:07:07 **21** Q. My question is what SAED pattern

14:07:10 **22** corresponds to anthophyllite?

14:07:12 **23** MR. CIRSCH: Object to form.

14:07:13 **24** THE WITNESS: Which one? There's 277 zone

14:07:16 **25** axes. We look for a typical d-spacing of a

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14:07:19 **1** different orientation for the two selected area
 14:07:23 **2** electron diffraction patterns we take.
 14:07:26 **3 Q.** (By Mr. Chachkes) Okay. So you determine
 14:07:28 **4** whether it's anthophyllite based on d-spacing when
 14:07:30 **5** you're talking about SAED only?
 14:07:33 **6** MR. CIRSCH: Object to form.
 14:07:33 **7** THE WITNESS: D-spacing and a second
 14:07:36 **8** pattern from a different crystalline orientation
 14:07:42 **9** so that you can rule out fibrous talc.
 14:07:45 **10 Q.** (By Mr. Chachkes) Okay. So for
 14:07:48 **11** tremolite, do you use two axes or just one?
 14:07:52 **12 A.** **Just one. It's not required for tremolite**
 14:07:56 **13 since fibrous talc does not have any calcium in it.**
 14:08:01 **14 And what you're looking for in an EDS pattern is make**
 14:08:05 **15 sure there's no aluminum.**
 14:08:07 **16 Q.** Okay. And for anthophyllite, you use --
 14:08:10 **17** you need two axes is what you're saying?
 14:08:13 **18 A.** **Two axes unless -- I think there's one in**
 14:08:16 **19 the entire bunch where we only did one.**
 14:08:19 **20 One axis if it doesn't have that**
 14:08:22 **21 pseudohexagonal pattern of talc. There's one**
 14:08:26 **22 reflection in talc -- I can't remember if it's the**
 14:08:30 **23 020 -- that some people say are similar. Doesn't**
 14:08:34 **24 look similar to me. But we just do two anyway for**
 14:08:38 **25 all these anthophyllite fibers and bundles.**
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14:08:40 **1 Q.** Okay. For talc you use two axes to
 14:08:43 **2** determine whether the SAED pattern corresponds to
 14:08:46 **3** talc?
 14:08:47 **4 A.** **No, we use two for anthophyllite solid**
 14:08:51 **5 solution series.**
 14:08:52 **6 Q.** What about talc, how do you determine
 14:08:54 **7** something under SAED is talc?
 14:08:56 **8 A.** **Chemistry and one SAED pattern that has**
 14:09:01 **9 the hexagonal dot pattern.**
 14:09:06 **10 Q.** Okay. So you use -- for the SAED portion
 14:09:10 **11** of identifying something as talc, you use only one
 14:09:13 **12** pattern; is that correct?
 14:09:15 **13 A.** **That's correct.**
 14:09:15 **14 Q.** Okay. If I took that one pattern that you
 14:09:21 **15** use to identify talc under SAED, can that pattern
 14:09:25 **16** only correspond to talc?
 14:09:29 **17** MR. CIRSCH: Object to form.
 14:09:30 **18** THE WITNESS: It can only correspond to
 14:09:32 **19** talc as long as you have the chemistry to go
 14:09:35 **20** along with it. Again, nothing here is done in a
 14:09:37 **21** vacuum of just one and nothing else.
 14:09:39 **22 Q.** (By Mr. Chachkes) Okay. My question
 14:09:41 **23** really isn't a vacuum. And I understand your
 14:09:43 **24** qualification you think it's completely unfair, but I
 14:09:46 **25** do want to hear what you have to say about this.
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14:09:48 **1** If I have an isolated SAED pattern for
 14:09:53 **2** talc in one axis and only that, no other information,
 14:10:00 **3** does that uniquely identify talc?
 14:10:02 **4** MR. CIRSCH: Object to form.
 14:10:03 **5** THE WITNESS: I would not call it. I
 14:10:04 **6** don't know what somebody else would do. I would
 14:10:07 **7** want to see what we're looking at. Certainly if
 14:10:09 **8** it's a talc plate versus chemistry -- but we're
 14:10:13 **9** primarily interested in the fibrous talc.
 14:10:15 **10** If you're an experienced TEM analyst, you
 14:10:20 **11** wouldn't just do it -- to me, my opinion, you
 14:10:23 **12** just wouldn't try in a vacuum without any
 14:10:25 **13** information to look at a talc SAED and say
 14:10:29 **14** that's talc.
 14:10:30 **15 Q.** (By Mr. Chachkes) Okay. So recall that
 14:10:31 **16** when I asked you my question, I'm saying looking at
 14:10:34 **17** SAED in a vacuum and then you went on to talk about a
 14:10:37 **18** number of things that aren't SAED, like chemistry,
 14:10:41 **19** fibers, plates. So this is a very specific question
 14:10:45 **20** and yes or no. Does a one-axis SAED pattern for talc
 14:10:54 **21** uniquely identify this as talc?
 14:10:58 **22** MR. CIRSCH: Object to form. He's already
 14:10:59 **23** answered the question.
 14:10:59 **24** THE WITNESS: I would not call it talc
 14:11:01 **25** just based on a one hexagonal pattern with no
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14:11:06 **1** other information.
 14:11:06 **2 Q.** (By Mr. Chachkes) Okay.
 14:11:06 **3 A.** **I would want to do -- and have the rest of**
 14:11:08 **4 the information that we talked about.**
 14:11:10 **5 I wouldn't do it. Maybe somebody else**
 14:11:12 **6 would. I can't comment on what other people might or**
 14:11:14 **7 might not do.**
 14:11:15 **8 Q.** Okay. So for tremolite, you are saying
 14:11:18 **9** you look at one axis as well; correct?
 14:11:20 **10 A.** **Correct.**
 14:11:21 **11 Q.** So same question. In a vacuum, all you
 14:11:25 **12** have is the SAED pattern for one axis for something
 14:11:32 **13** you otherwise would call tremolite. Does that
 14:11:34 **14** uniquely and only identify tremolite?
 14:11:37 **15** MR. CIRSCH: Object to form.
 14:11:38 **16** THE WITNESS: If you were going to do
 14:11:42 **17** that, and you were -- for whatever reason that
 14:11:46 **18** here is an SAED pattern, there is nothing else,
 14:11:52 **19** if it was a zone axis, then you'd have to get
 14:11:55 **20** two zone axes, and now you're dealing with like
 14:11:58 **21** no chemistry, no idea where the tremolite fiber
 14:12:01 **22** came -- if it is tremolite.
 14:12:03 **23** So I would not do it. I can't talk about
 14:12:05 **24** what other people would do.
 14:12:06 **25 Q.** (By Mr. Chachkes) Okay. And indeed, a
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14:12:11 **1** single axis SAED pattern for something that in your

14:12:18 **2** report corresponds to tremolite can also correspond

14:12:23 **3** to many other crystalline structures as well;

14:12:26 **4** correct?

14:12:26 **5** MR. CIRSCH: Object to form.

14:12:27 **6** **Q.** (By Mr. Chachkes) Just in a vacuum.

14:12:29 **7** Again, with all the qualifications that you don't

14:12:32 **8** want to do it in a vacuum, but my question is in a

14:12:35 **9** vacuum.

14:12:35 **10** MR. CIRSCH: Object to form.

14:12:36 **11** THE WITNESS: It would be a typical

14:12:37 **12** amphibole diffraction pattern. You could say

14:12:39 **13** it's an amphibole, but how far you're willing to

14:12:41 **14** go on that on just that without any other

14:12:44 **15** information, no chemistry, no structure

14:12:48 **16** interface, no morphology, I would not call it

14:12:51 **17** tremolite.

14:12:51 **18** **Q.** (By Mr. Chachkes) Okay. So for

14:12:54 **19** anthophyllite, where you have two axes and so like

14:13:00 **20** two SAED patterns, in a vacuum, do those two patterns

14:13:06 **21** sitting in front of you, no other information,

14:13:08 **22** uniquely identify what you're looking at as

14:13:11 **23** anthophyllite?

14:13:11 **24** MR. CIRSCH: Object to form.

14:13:12 **25** THE WITNESS: I don't know. Certainly

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14:13:13 **1** would rule out talc with the two patterns.

14:13:16 **2** If I wasn't told that this came out of a

14:13:18 **3** cosmetic talc bulk sample and wasn't allowed to

14:13:21 **4** look at any chemistry, if I wasn't allowed to do

14:13:24 **5** any EDXA and morphology, I probably would not

14:13:31 **6** spend the time contemplating what that was.

14:13:33 **7** **Q.** (By Mr. Chachkes) Okay. You agree that

14:13:36 **8** the same particle can have different SAED patterns at

14:13:42 **9** different orientations; right?

14:13:43 **10** **A. Yes.**

14:13:43 **11** **Q.** And an SAED analyst can take measurements

14:13:49 **12** of the crystals on various axes; correct?

14:13:53 **13** **A. Yes. You can get zone axis, and depending**

14:13:56 **14** **on the orientation of the fiber or bundle, you may**

14:13:59 **15** **get two -- tough to get three because of your limited**

14:14:04 **16** **mobility of tilting the fiber; you have to double**

14:14:08 **17** **tilt it. You could probably get three if one wanted.**

14:14:11 **18** **Q.** Okay. Are you an expert in SAED pattern

14:14:17 **19** analysis?

14:14:18 **20** **A. I probably know more than the average**

14:14:20 **21** **layperson.**

14:14:21 **22** **Q.** Okay. But are you an expert? Are you

14:14:24 **23** somebody, for example, who maybe published any

14:14:27 **24** articles on SAED pattern analysis?

14:14:30 **25** MR. CIRSCH: Object to form.

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14:14:31 **1** THE WITNESS: I have not published any,

14:14:32 **2** no.

14:14:32 **3** **Q.** (By Mr. Chachkes) Have you taught SAED

14:14:34 **4** pattern analysis?

14:14:35 **5** **A. Been a while, but yes.**

14:14:37 **6** **Q.** To whom?

14:14:38 **7** **A. Graduate students back in the day when I**

14:14:41 **8** **was visiting assistant professor.**

14:14:42 **9** **Q.** How many orientations do you need to

14:14:47 **10** uniquely identify a mineral with SAED and only SAED?

14:14:52 **11** **A. A minimum of two, maybe three.**

14:14:54 **12** **Q.** Measurements on an SAED are taken in

14:15:01 **13** angstroms; correct?

14:15:02 **14** **A. Yes, sir, an angle, angle between -- you**

14:15:07 **15** **identify, say, the 002, then you have to get to**

14:15:10 **16** **another orientation, say, the 010 or the minus 020,**

14:15:17 **17** **and then take the angles and do the measurements or**

14:15:20 **18** **use CrystalMaker.**

14:15:21 **19** **Q.** Okay. CrystalMaker software that helps

14:15:24 **20** you analyze?

14:15:24 **21** **A. Well, as long as it has the appropriate**

14:15:26 **22** **standards in it, you could.**

14:15:28 **23** **Q.** Do you use CrystalMaker?

14:15:30 **24** **A. We have CrystalMaker. But, no, it's not**

14:15:32 **25** **required for what we do.**

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14:15:33 **1** **Q.** Okay. If you put what you otherwise

14:15:40 **2** identified as an SAED pattern for tremolite into

14:15:44 **3** CrystalMaker without the other end pop, the

14:15:47 **4** identification, this is tremolite?

14:15:49 **5** MR. CIRSCH: Object to form.

14:15:50 **6** THE WITNESS: If you had the appropriate

14:15:51 **7** zone axis and nothing else, it might.

14:15:54 **8** **Q.** (By Mr. Chachkes) You don't know one way

14:15:55 **9** or the other? Have you ever done that?

14:15:57 **10** **A. Have we used CrystalMaker? We have used**

14:15:59 **11** **it in the past, but we don't use it for this**

14:16:02 **12** **analysis.**

14:16:03 **13** **Q.** So have you done CrystalMaker on a single

14:16:06 **14** axis? Have you used CrystalMaker for a single axis

14:16:16 **15** SAED pattern?

14:16:16 **16** MR. CIRSCH: Object to form.

14:16:17 **17** THE WITNESS: I don't recall doing that.

14:16:18 **18** **Q.** (By Mr. Chachkes) Okay. When I talked

14:16:20 **19** about measurements being taken in angstroms, that's

14:16:22 **20** the measurement between the dots; right?

14:16:23 **21** **A. Yes.**

14:16:24 **22** **Q.** And that's what we're calling d-space?

14:16:27 **23** **A. D-space is between the planes. That's the**

14:16:28 **24** **measurement we do now.**

14:16:30 **25** **Q.** What's the difference between what I said

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14:16:32 1 and what you said?

14:16:33 2 A. Well, you can get to the different planes,

14:16:35 3 but you can also get to -- the d-spacing is the

14:16:38 4 layers of atoms on top of each other.

14:16:40 5 Q. Okay. Can you describe how your analyst

14:16:50 6 calibrates the SAED apparatus?

14:16:55 7 A. They do.

14:16:55 8 Q. No, I'm sorry, can you describe how they

14:16:57 9 do it?

14:16:57 10 A. Well, they get the working distance, and

14:16:59 11 typically they're using a gold standard for the rings

14:17:02 12 and the working distance so they can do that

14:17:05 13 calibration.

14:17:05 14 Q. When you say a gold standard, what do you

14:17:07 15 mean by that?

14:17:07 16 A. Well, you take something that's fibrous

14:17:11 17 and you put a gold film on the top so that you get

14:17:14 18 the outer rings of the gold, which is a standard

14:17:16 19 measurement, and then the working distance so you can

14:17:18 20 calibrate.

14:17:19 21 Q. Literally a standard made of gold; is that

14:17:22 22 what you're saying?

14:17:23 23 A. Yes. Well, it's a very small piece of

14:17:26 24 gold wire --

14:17:26 25 Q. Okay.

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14:17:26 1 A. -- that you sputter, so you're not using a

14:17:28 2 lot.

14:17:29 3 Q. How often do your analysts calibrate the

14:17:33 4 SAED apparatus?

14:17:35 5 A. Whatever is required for our NVLAP

14:17:37 6 accreditation.

14:17:38 7 Q. Do you have any -- sitting here today, do

14:17:40 8 you know what that is?

14:17:40 9 A. No.

14:17:41 10 Q. Is that in your report?

14:17:43 11 A. No, sir.

14:17:44 12 Q. Okay. So do your analysts tilt the stage

14:17:56 13 on the TEM to direct the electrons at a certain face

14:18:00 14 of the crystal?

14:18:01 15 MR. CIRSCH: Object to form.

14:18:02 16 THE WITNESS: The only fibrous material

14:18:06 17 that we tilt the stage is when we suspect the

14:18:10 18 anthophyllite solid solution series, where we

14:18:13 19 rotate it to make sure that the hexagonal

14:18:19 20 plane -- it's not even the hexagonal plane.

14:18:23 21 It's a -- I always forget. It's either an 020

14:18:26 22 or an 002 reflection off the talc, fibrous talc

14:18:31 23 orientation.

14:18:37 24 Q. (By Mr. Chachkes) Okay. Can you point me

14:18:37 25 to published peer-reviewed literature where that's an

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14:18:37 1 appropriate way to identify that mineral?

14:18:39 2 MR. CIRSCH: Object to form.

14:18:40 3 THE WITNESS: I can't. I mean, as I sit

14:18:46 4 here, I don't recall.

14:18:47 5 Q. (By Mr. Chachkes) Okay. Are the TEMs in

14:18:51 6 your lab equipped with -- I'm going to butcher the --

14:18:56 7 is it goniometer?

14:18:57 8 A. Goniometer.

14:18:58 9 Q. Okay. Are the TEMs in your lab equipped

14:19:00 10 with goniometers to rotate particles?

14:19:03 11 A. Yes. We have a double-tilt holder that we

14:19:05 12 use if we're going to do zone axis. And we have a

14:19:08 13 goniometer that can rotate the sample I think up to

14:19:15 14 30 degrees, so it's usually at zero tilt.

14:19:21 15 Q. Okay. In your report I don't see any SAED

14:19:25 16 patterns done for a single subject crystal in three

14:19:29 17 different axes. That's correct; right?

14:19:31 18 A. That is correct, you will not find that.

14:19:32 19 Q. And you didn't do that?

14:19:33 20 A. No.

14:19:34 21 Q. Okay. Did your analyst document every

14:19:40 22 instance in the report where they used multiple SAED

14:19:44 23 patterns?

14:19:45 24 A. I hope so.

14:19:52 25 MR. CHACHKES: Maybe we should -- let's go

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14:19:54 1 to this one.

14:20:30 2 (Defendants' Exhibit 15 was marked for

14:20:32 3 identification.)

14:20:32 4 Q. (By Mr. Chachkes) Okay. Marked as

14:20:34 5 Exhibit 15, you recognize this as a three-axis SAED

14:20:38 6 for tremolite; right?

14:20:39 7 A. I know that's what it states.

14:20:40 8 Q. In your opinion, is that different? Is

14:20:43 9 this not a three-axis?

14:20:46 10 A. Well, it says it's -- you know the 100,

14:20:49 11 the 010, and the 001, that would be three crystal

14:20:53 12 orientations by the Miller indices. Now, if that's

14:20:56 13 what we're looking at here or not, I would have to go

14:20:59 14 measure it, get the camera constant, et cetera.

14:21:03 15 So I'm not here to dispute it, but I can't

14:21:06 16 validate that's what it is.

14:21:08 17 Q. Is there anything -- looking at this right

14:21:09 18 now, is there any reason you have to dispute that

14:21:11 19 indeed this is an accurate three-axis SAED for

14:21:16 20 tremolite?

14:21:17 21 MR. CIRSCH: Object to form.

14:21:18 22 THE WITNESS: I have no reason to dispute

14:21:19 23 it. I have no reason to accept it.

14:21:19 24 Q. (By Mr. Chachkes) Okay.

14:21:20 25 A. If that's what you're saying it is, then

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14:21:22 **1 that's what you're saying.**

14:21:23 **2 Q.** Okay. You see that the pattern is

14:21:26 **3 different for each of the three axes?**

14:21:27 **4 A. Well, you have three different crystal**

14:21:29 **5 orientations.**

14:21:30 **6 Q.** Okay.

14:21:31 **7 A. Of course it's going to be different.**

14:21:32 **8 Q.** Okay. So you predicted my next question,

14:21:36 **9 which is in your experience, three different crystal**

14:21:38 **10 orientations for SAED for the same crystal may or**

14:21:42 **11 probably will produce three different patterns;**

12 correct?

14:21:44 **13 A. That is correct.**

14:21:44 **14 Q.** Okay. For tremolite it certainly will

14:21:48 **15 produce three different patterns?**

14:21:50 **16 A. For most of your fibrous crystals where**

14:21:54 **17 you can rotate it, yes.**

14:21:56 **18 Q.** Including anthophyllite and fibrous talc?

14:22:01 **19 MR. CIRSCH:** Object to form.

14:22:02 **20 THE WITNESS:** Including -- no. Fibrous

14:22:02 **21 talc, not. You can rotate it. You're only**

14:22:05 **22 going to get one pattern. That's why if you do**

14:22:09 **23 see the reflection that some people will argue**

14:22:12 **24 looks a little bit like what anthophyllite can**

14:22:15 **25 do, you rotate it, and that never changes.**

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14:22:51 **1 MR. CHACKES:** Okay. Let's mark as 16.

14:22:53 **2 (Defendants' Exhibit 16 was marked for**

14:23:07 **3 identification.)**

14:23:07 **4 Q.** (By Mr. Chackes) Okay. So do you

14:23:09 **5 recognize what's been marked as Exhibit 16?**

14:23:10 **6 A. Yes, Verification of 0-Degree Amphibole**

14:23:13 **7 Diffraction Patterns, these are our documents.**

14:23:16 **8 Q.** Okay. This was produced to us, I think,

14:23:20 **9 Saturday. Do you recall giving this to plaintiffs'**

14:23:23 **10 counsel recently --**

14:23:24 **11 A. I do.**

14:23:24 **12 Q.** -- to produce?

14:23:27 **13 Okay. What is it? Can you just -- on a**

14:23:28 **14 high level, what am I looking at?**

14:23:31 **15 A. High level, we're looking at the**

14:23:32 **16 d-spacings of, most likely, tremolite and**

14:23:40 **17 anthophyllite.**

14:23:40 **18 Q.** And this corresponds to a number of

14:23:49 **19 samples that appear in your report; correct?**

14:23:51 **20 A. It does.**

14:23:51 **21 Q.** Okay. And to figure out which page

14:23:56 **22 relates to which diffraction pattern, I can look on**

14:24:01 **23 that page and it's written in there somewhere; right?**

14:24:06 **24 A. You'll have to -- I'm sorry.**

14:24:07 **25 Q.** I think I might have messed that up

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14:24:12 **1 linguistically. I'm going to do that again.**

14:24:13 **2 A. That's fine.**

14:24:13 **3 Q.** If I want to figure out which sample a

14:24:17 **4 particular verification page refers to, that sample**

14:24:20 **5 is written on the page; correct?**

14:24:21 **6 A. Yeah, each sample number is on here.**

14:24:24 **7 Q.** Okay.

14:24:24 **8 A. You know, M68503-001. So you would look**

14:24:28 **9 for '60, '70s, '80s, wherever it is, and then the**

14:24:36 **10 second number, -001, would be the number 1 or the**

14:24:38 **11 first asbestos structure or bundle that is the**

14:24:42 **12 diffraction pattern is being taken.**

14:24:44 **13 Q.** Sorry. And you went a little quick for

14:24:47 **14 me, and I apologize --**

14:24:49 **15 A. That's all right. So you see the number**

14:24:50 **16 there, M68503 --**

14:24:51 **17 Q.** Okay. So I see that as MAS job number.

14:24:53 **18 That's where you're pointing?**

14:24:54 **19 A. Right.**

14:24:55 **20 Q.** And can you actually, just so we're on the

14:24:55 **21 same page, literally, can you go to the first**

14:25:00 **22 verification?**

14:25:00 **23 Okay. So you've got the MAS job number,**

14:25:02 **24 and I'm looking at the number that begins M68**

14:25:05 **25 something, something, something. Okay. How does**

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14:25:06 **1 that tell me what sample that refers to?**

14:25:09 **2 A. Well, our job number would be M68503. If**

14:25:14 **3 you go to the various '60s, '70s, and '80s, you'll**

14:25:17 **4 see that number.**

14:25:18 **5 Q.** Sorry. Let's pause. '60s, '70s, and

14:25:21 **6 '80s, you're referring to year --**

14:25:22 **7 A. The decades.**

14:25:23 **8 Q.** Okay.

14:25:23 **9 A. And so then you look for -- if it has**

14:25:26 **10 M68503 on there, you look for the first dash, 001.**

14:25:31 **11 Q.** And what's the first dash refer to?

14:25:33 **12 A. Right. That will tell you that that is**

14:25:35 **13 the actual sample number. Then you can go -- it will**

14:25:39 **14 tell you what tab to look under.**

14:25:41 **15 And then the second sample number is 001,**

14:25:44 **16 means that is the first asbestos, in this case,**

14:25:49 **17 anthophyllite solid solution series. It's the very**

14:25:53 **18 first structure up. So you can go then to the data**

14:25:56 **19 there and find that very first diffraction pattern.**

14:25:59 **20 Q.** Okay. But when you say the data there, is

14:26:02 **21 that data you're referring to in Exhibit 16?**

14:26:04 **22 A. No, the data that is in the actual data**

14:26:07 **23 notebooks.**

14:26:07 **24 Q.** Got it. And your ability to identify

14:26:12 **25 '60s, '70s, '80s decades, is that something inherent**

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14:26:17 **1** in the job number? Is that like coded in there? How

14:26:19 **2** did you --

14:26:19 **3** **A. That's why I used all of them.**

14:26:20 **4** **Q.** Oh, okay.

14:26:21 **5** **A.** If you'll give me one, I can -- you know,

14:26:22 **6** **I can probably find it. I didn't bring those along.**

14:26:24 **7** **They're getting too big.**

14:26:26 **8** **Q.** Okay. I see on this page, date verified

14:26:31 **9** 11/19/18; do you see that?

14:26:33 **10** **A. Yes.**

14:26:35 **11** **Q.** What does that mean? What was verified?

14:26:37 **12** **A. That means that's the date that the data**

14:26:39 **13** **was run for this particular program that did this**

14:26:44 **14** **analysis.**

14:26:45 **15** **Q.** Is that the date of the SAED as well?

14:26:48 **16** **A. No. If you go over to the right-hand**

14:26:51 **17** **side, it says date of photo --**

14:26:53 **18** **Q.** Okay.

14:26:54 **19** **A. -- 10/29/2018, and the SAED pattern should**

14:26:57 **20** **have that date on it.**

14:26:58 **21** **Q.** Got it. And when you say the data was run

14:27:02 **22** on November 19, 2018, was it put into some computer

14:27:07 **23** program, or someone did a hand d-spacing? How was

14:27:11 **24** that --

14:27:12 **25** **A. No. The information is put in, it's all**

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14:27:14 **1** **digital, and it does the calculation. When you put**

14:27:17 **2** **in the, you know, the distance, the camera constant,**

14:27:22 **3** **and then it will calculate the d-spacing.**

14:27:24 **4** **Q.** I'm sorry, when you say it, there's a

14:27:26 **5** software that you're using?

14:27:28 **6** **A. Yes.**

14:27:28 **7** **Q.** And does the software kind of just read

14:27:30 **8** the image? You don't have to actually calculate the

14:27:32 **9** d-spacing by hand?

14:27:33 **10** **A. Well, you have to put in the information**

14:27:35 **11** **on the camera constant, but then it will read the**

14:27:39 **12** **pattern and calculate what the d-spacing is.**

14:27:42 **13** **Q.** Got it. And do you know the name of that

14:27:44 **14** software?

14:27:45 **15** **A. I do not.**

14:27:46 **16** **Q.** Is that on your computer?

14:27:48 **17** **A. It's on the TEM computers.**

14:27:52 **18** **Q.** Okay. The numbers that it generates for

14:27:57 **19** d-spacing, is that fully disclosed here on this page?

14:28:03 **20** **A. Yes.**

14:28:04 **21** **Q.** Okay.

14:28:05 **22** **A. Over here on the calculated spacing of**

14:28:07 **23** **5.23, and if you go to anthophyllite, the d-spacing**

14:28:11 **24** **is in that range of 5.02 to 5.54 on the range, plus**

14:28:17 **25** **or minus 5 percent.**

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14:28:19 **1** **Q.** And is the reason that zone axis

14:28:22 **2** information on the lower left is not put in there is

14:28:24 **3** because you really only ran one?

14:28:26 **4** **A. Well, you can get a zone axis -- if you**

14:28:28 **5** **happen to hit a zone axis, it will -- you can**

14:28:34 **6** **calculate through that. The second anthophyllite**

14:28:36 **7** **pattern for this one fiber on the next page has a**

14:28:41 **8** **zone axis that said it was near the 101.**

14:28:43 **9** **Q.** Got it. So you're saying is that the

14:28:48 **10** first verification page that I'm looking at is one

14:28:51 **11** zone axis, and the second page is another zone axis

14:28:54 **12** for the same anthophyllite particle?

14:28:55 **13** **A. No. Not quite.**

14:28:57 **14** **Q.** Okay.

14:28:57 **15** **A. The first one is just d-spacing, the**

14:28:59 **16** **second one is just d-spacing. In this particular**

14:29:02 **17** **case when they went to the second orientation, they**

14:29:05 **18** **got very close to the 101 zone axis.**

14:29:08 **19** **Q.** Okay. So there's two orientations on

14:29:11 **20** these page 1 and page 2, one is one orientation, the

14:29:14 **21** second is another orientation?

14:29:16 **22** **A. Correct, for the same fiber/bundle.**

14:29:18 **23** **Q.** Got it. We've looked through this, and

14:29:22 **24** we've totaled 35 samples, which is less than the 72

14:29:28 **25** samples in your report. Is that consistent with what

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14:29:31 **1** you believe this to be?

14:29:34 **2** **MR. CIRSCH:** Object to form.

14:29:35 **3** **THE WITNESS:** Well, a number of samples

14:29:38 **4** were negative. There would be no zone axis

14:29:42 **5** pattern.

14:29:42 **6** A number of the samples would not have

14:29:45 **7** been run through because we were doing

14:29:46 **8** verification of Lee Poye's samples, and there's

14:29:51 **9** a lot of different samples. I believe we have

14:29:53 **10** produced all the ones that we have taken.

14:29:55 **11** **Q.** (By Mr. Chachkes) Okay. There were 50

14:29:57 **12** positives amongst the 72 samples you looked at, and

14:30:00 **13** yet only 35 samples for which we have the diffraction

14:30:08 **14** verifications. Am I incorrect there?

14:30:11 **15** **MR. CIRSCH:** Object to form.

14:30:13 **16** **THE WITNESS:** Well, a number of positive

14:30:15 **17** samples there was no TEM because it was

14:30:19 **18** negative. The Lee Poye verification on his, he

14:30:25 **19** had six negatives where we found it positive by

14:30:29 **20** PLM. And then an extra sample. I'll have to

14:30:35 **21** add it all up now. I believe you have

14:30:38 **22** everything if we went through and did the math.

14:30:40 **23** **Q.** (By Mr. Chachkes) Okay. You had

14:30:41 **24** personally in your lab, MAS, 50 positives; right?

14:30:46 **25** **MR. CIRSCH:** Object to form.

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14:30:47 **1** Q. (By Mr. Chachkes) Let's strike that. All
 14:30:57 **2** right.
 14:30:57 **3** So the top of your own supplemental report
 14:31:00 **4** reads that -- I'm going to read a sentence from your
 14:31:05 **5** report, This new information changed the total number
 14:31:07 **6** of containers/samples analyzed from 71 to 72 and the
 14:31:11 **7** total positive samples from 49 to 50.
 14:31:14 **8** That's accurate; right?
 14:31:15 **9** A. Yes.
 14:31:15 **10** Q. Okay. If there are 50 positives -- let's
 14:31:19 **11** only talk about the positives. If there are 50
 14:31:21 **12** positive, why only have verifications for 35?
 14:31:24 **13** A. Well, off the top of my head, five of the
 14:31:29 **14** positives out of six is from Lee Poye's analysis. We
 14:31:34 **15** did not verify his negative samples. Those became
 14:31:38 **16** positive because of the Blount PLM and the ISO PLM.
 14:31:43 **17** Also, the two samples in Lee Poye where we could not
 14:31:47 **18** verify the nine out of 11, they became positive by
 14:31:52 **19** PLM. So now we're up to seven.
 14:31:55 **20** Q. Of the 15 we're missing; right?
 14:31:58 **21** A. Not missing any.
 14:31:59 **22** Q. Okay.
 14:31:59 **23** A. Now there's a number of samples through
 14:32:02 **24** here where the PLM and/or ISO was positive and the
 14:32:05 **25** TEM was not. If the TEM is negative, there's no
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14:32:09 **1** SAED. I think that will get you to your number.
 14:32:13 **2** Q. Got it.
 14:32:15 **3** So if there was a positive under TEM in
 14:32:19 **4** the MAS laboratory, I've got the verification here in
 14:32:23 **5** Exhibit 16?
 14:32:26 **6** A. You are supposed to.
 14:32:31 **7** MS. O'DELL: Let me just insert an
 14:32:31 **8** objection. There were a number of I think six
 14:32:33 **9** files that were produced very similar to
 14:32:35 **10** Exhibit 16, so they're not all contained in that
 14:32:37 **11** exhibit and --
 14:32:37 **12** MR. CHACHKES: And I agree --
 14:32:44 **13** MS. O'DELL: The record shouldn't reflect
 14:32:45 **14** that they are. There are five more documents
 14:32:48 **15** that are very similar to Exhibit 16 --
 14:32:48 **16** MR. CHACHKES: Yeah.
 14:32:51 **17** Q. (By Mr. Chachkes) And I apologize.
 14:32:51 **18** Everything I said was correct, except you have to
 14:32:54 **19** take the six files that you gave me, put them
 14:32:57 **20** together, and we only have 35.
 14:32:58 **21** A. I understood that.
 14:32:59 **22** MR. CHACHKES: Okay. So as long as the
 14:33:01 **23** witness understood, I think we're good.
 14:33:03 **24** MS. O'DELL: That's not true, but I'm glad
 14:33:06 **25** we clarified.
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14:33:08 **1** MR. CHACHKES: Well, I interpret "I
 14:33:09 **2** understood" differently than you do.
 14:33:11 **3** Q. (By Mr. Chachkes) Was a diffraction --
 14:33:12 **4** okay. Skip that.
 14:33:14 **5** Now, what are these ranges up here at the
 14:33:20 **6** top? I see like a table. What's that? The same
 14:33:25 **7** table appears to be reproduced in every single
 14:33:27 **8** verification page; am I right?
 14:33:28 **9** A. Right. That gives you the amphibole
 14:33:30 **10** types, the page number it's on, card number for the
 14:33:33 **11** mineral pallet diffraction file, and it gives the
 14:33:37 **12** calculated spacings in the range.
 14:33:39 **13** So these d-spacings are all tied back to a
 14:33:44 **14** standard that every lab should have for these
 14:33:50 **15** particular type of regulated asbestos structures.
 14:33:53 **16** Q. Okay. The page number refers to a page of
 14:33:57 **17** what, in the table?
 14:33:59 **18** A. Page of the Mineral Powder Diffraction
 14:34:02 **19** File Data for that particular mineral.
 14:34:03 **20** So grunerite will be found on page 449.
 14:34:07 **21** It will be card number 31-631. And on that card
 14:34:11 **22** number it will give you the calculated d-spacings for
 14:34:15 **23** that particular mineral.
 14:34:16 **24** Q. Okay. So it's a page within the Mineral
 14:34:21 **25** Powder Diffraction File, and then in that page is
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14:34:23 **1** something called a card. I imagine that's like a
 14:34:25 **2** little box?
 14:34:26 **3** A. Correct. And it will give you all the
 14:34:30 **4** d-spacing information that's published here.
 14:34:32 **5** Q. Okay. And the range, I see in the last
 14:34:37 **6** column on the right, that's the margin of error?
 14:34:41 **7** A. Correct.
 14:34:42 **8** Q. Now, if I'm reading this correctly, U4, on
 14:34:47 **9** this first page of the verification, you calculated a
 14:34:50 **10** spacing of 5.23; correct?
 14:34:53 **11** A. Correct.
 14:34:54 **12** Q. And that falls within every single
 14:34:57 **13** amphibole types range in that chart?
 14:35:01 **14** A. That's correct.
 14:35:01 **15** Q. How is it you identified this as
 14:35:08 **16** anthophyllite when it falls within five different
 14:35:13 **17** d-spacing ranges?
 14:35:15 **18** A. Do I get to use the other data that's
 14:35:17 **19** generated, or is this one of those in a vacuum type
 14:35:19 **20** questions?
 14:35:20 **21** Q. Let's say in a vacuum. In a vacuum.
 14:35:22 **22** MR. CIRSCH: Object to form.
 14:35:23 **23** THE WITNESS: I wouldn't -- if I just had
 14:35:25 **24** the d-spacing without any information, I
 14:35:28 **25** wouldn't make that call. I wouldn't say that it
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14:35:30 **1** was anthophyllite. I would say it is consistent
14:35:32 **2** with the typical amphibole d-spacing.
14:35:34 **3** **Q.** (By Mr. Chachkes) Okay. What other
14:35:36 **4** amphibole in the Mineral Powder Diffraction File have
14:35:44 **5** d-spacing ranges that span 5.23?
14:35:48 **6** **A.** **Most of your amphibole minerals, both**
14:35:52 **7** **monoclinic and orthorhombic, will have d-spacings in**
14:35:56 **8** **this range.**
14:35:57 **9** **Q.** What about nonamphiboles, are there
14:36:01 **10** nonamphibole crystals that have d-spacings that the
14:36:03 **11** range covers 5.23?
14:36:05 **12** **A.** **I don't believe so.**
14:36:06 **13** **Q.** The --
14:36:31 **14** **A.** **Are we done with this one?**
14:36:32 **15** **Q.** For now, yes.
14:36:34 **16** Let's go to another exhibit. That's going
14:36:37 **17** to be -- let her mark it up.
18 **A.** **Oh. Sorry.**
14:36:41 **19** MR. CHACHKES: That's going to be 17.
14:36:43 **20** (Defendants' Exhibit 17 was marked for
14:36:59 **21** identification.)
14:36:59 **22** **Q.** (By Mr. Chachkes) Is this the same sort
14:37:02 **23** of document as 16? Is this one of the --
14:37:04 **24** **A.** **Yes.**
14:37:04 **25** **Q.** Okay. At the top, I see that for your
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14:37:23 **1** SAED analysis you have an equation to determine
14:37:27 **2** spacing; do you see that?
14:37:28 **3** **A.** **We have the camera constant divided by the**
14:37:34 **4** **measured distance, yes.**
14:37:35 **5** **Q.** Okay. And in your -- your methodology
14:37:43 **6** determined the spacing by dividing the camera
14:37:45 **7** constant by the measured distance; is that correct?
14:37:48 **8** **A.** **Correct.**
14:37:49 **9** **Q.** And why does MAS use this formula?
14:37:52 **10** **A.** **That's the standard formula. You can --**
14:37:57 **11** **the pixels is part of the computer program where you**
14:38:01 **12** **could -- in the old days you'd actually measure it.**
14:38:03 **13** **Q.** Can you provide a reference in the
14:38:05 **14** scientific literature that reflects this equation?
14:38:08 **15** **A.** **CrystalMaker has it.**
14:38:12 **16** **Q.** CrystalMaker software; right?
14:38:15 **17** **A.** **Software. Yes, somewhere I can find it**
14:38:17 **18** **from the old days the formula for this.**
14:38:20 **19** **Q.** Okay. You didn't cite anything in your
14:38:22 **20** paper, correct, in your reports; correct?
14:38:25 **21** **A.** **No, because it's a standard method that**
14:38:27 **22** **all TEM labs do that do this, so.**
14:38:30 **23** **Q.** The manual -- I'm sorry, the measured
14:38:34 **24** distance than the denominator, that's manually
14:38:38 **25** measured, or is that measured automatically by
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14:38:39 **1** software?
14:38:39 **2** **A.** **It's measured off the image that's been**
14:38:43 **3** **calibrated.**
14:38:43 **4** **Q.** Okay. It's measured off the image --
14:38:45 **5** **A.** **Of the diffraction -- diffraction pattern**
14:38:48 **6** **when you run the program, yes.**
14:38:48 **7** **Q.** Okay. So it's measured by the program,
14:38:50 **8** not somebody -- a human being with a ruler?
14:38:51 **9** **A.** **Not anymore.**
14:38:53 **10** **Q.** Okay. Used to be manual?
14:38:54 **11** **A.** **Old days, yes.**
12 **Q.** Okay.
14:38:56 **13** **A.** **When you actually took a negative and**
14:38:58 **14** **every TEM lab had a dark room. And thank goodness**
14:39:03 **15** **those days are over.**
14:39:04 **16** **Q.** Can you provide me a reference in the
14:39:07 **17** scientific literature that permits the identification
14:39:16 **18** of an asbestos type strictly by an EDS -- sorry --
14:39:25 **19** SAED pattern? Strike that. Let me ask that better.
14:39:28 **20** Can you provide me a reference in the
14:39:29 **21** published literature -- in the scientific literature
14:39:31 **22** that sanctions identifying an asbestos simply by a
14:39:39 **23** single axis SAED pattern?
14:39:42 **24** **A.** **I think we already talked about that. I'm**
14:39:44 **25** **not sure any scientific literature would say if**
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14:39:47 **1** **you're only handed the information from one zone axis**
14:39:51 **2** **diffraction pattern without the rest of the**
14:39:55 **3** **information -- if you have a good zone axis and it**
14:40:01 **4** **matches, you may be able to do the calculation.**
14:40:06 **5** **So one zone axis -- you might be able to**
14:40:11 **6** **do that if you're looking at between two different**
14:40:14 **7** **minerals, say, a monoclinic versus an orthorhombic.**
14:40:19 **8** **If you have no information whatsoever, I**
14:40:25 **9** **don't know. I don't know if you could do it with**
14:40:27 **10** **just one. I'd have to see.**
14:40:28 **11** **Q.** Okay. The Mineral Powder Diffraction File
14:40:32 **12** Data, is that a book I can go out in the library and
14:40:36 **13** get?
14:40:37 **14** MR. CIRSCH: Object to form.
14:40:38 **15** THE WITNESS: I imagine, if it's only an
14:40:39 **16** engineering library or a library at a
14:40:42 **17** university. You can order it online.
14:40:44 **18** **Q.** (By Mr. Chachkes) Okay. It's generated
14:40:46 **19** by somebody outside of MAS?
14:40:48 **20** **A.** **No, this is not an MAS book. This is the**
14:40:54 **21** **Mineral Powder Diffraction File Data Book. There's**
14:40:55 **22** **an international standard for these types of cards**
14:40:59 **23** **for the crystalline structure information.**
14:41:01 **24** **Q.** Okay. What's the d-spacing for talc?
14:41:15 **25** **A.** **I don't know.**
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14:41:17 **1** Q. Is the d-spacing for talc within the
 14:41:22 **2** ranges we see here for -- in your chart for regulated
 14:41:26 **3** asbestos?
 14:41:26 **4** A. **It's been a while since I've calculated**
 14:41:30 **5 it, so I'd have to look that up.**
 14:41:33 **6** Q. Why do you only have amphiboles in your
 14:41:41 **7** reference chart?
 14:41:46 **8** MR. CIRSCH: Object to form.
 14:41:47 **9** THE WITNESS: Because this is the 0-degree
 14:41:50 **10** amphibole diffraction pattern table.
 14:41:53 **11** Q. (By Mr. Chachkes) So are you assuming
 14:41:56 **12** going into looking at the SAED pattern that you're
 14:41:59 **13** looking at an amphibole, or you're saying the
 14:42:02 **14** amphibole patterns that you're looking at could
 14:42:04 **15** only -- the patterns you're looking at could only be
 14:42:06 **16** amphiboles?
 14:42:07 **17** A. **There's no serpentine materials in here.**
 14:42:12 **18 We've never measured chrysotile -- ever detected**
 14:42:15 **19 chrysotile asbestos in any of the TEM analysis**
 14:42:17 **20 because of the heavy liquid density separation.**
 14:42:21 **21 And we don't go in blind or in a vacuum**
 14:42:24 **22 when we do this. The chrysotile diffraction patterns**
 14:42:29 **23 are very unique; the morphology is very unique. So**
 14:42:33 **24 when we have amphiboles, we have a different chart.**
 14:42:36 **25** Q. And again -- strike that.
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14:42:44 **1** I think I already asked this question, I
 14:42:48 **2** apologize if I'm asking it twice, but there are
 14:42:51 **3** nonamphiboles that have d-spacing within the ranges
 14:42:53 **4** we see in this chart, that is, crystals that are
 14:43:00 **5** nonamphiboles?
 14:43:00 **6** A. **Most amphiboles will have d-spacings in**
 14:43:03 **7 this range.**
 14:43:04 **8** Q. My question is are there crystals that
 14:43:08 **9** aren't amphiboles and aren't serpentine that have
 14:43:11 **10** d-spacings in this range?
 14:43:13 **11** MR. CIRSCH: Object to form.
 14:43:14 **12** THE WITNESS: Nonamphiboles, not that I'm
 14:43:16 **13** aware of.
 14:43:16 **14** Q. (By Mr. Chachkes) For example, are there
 14:43:17 **15** any phyllosilicates that have d-spacing in these
 14:43:21 **16** ranges?
 14:43:21 **17** A. **I don't believe so.**
 14:43:22 **18** Q. Okay. You're stating to within a degree
 14:43:25 **19** of scientific certainty there aren't any --
 14:43:28 **20** MR. CIRSCH: Object --
 14:43:28 **21** THE WITNESS: When I say I don't believe
 14:43:29 **22** so, I don't think I hold that within a
 14:43:32 **23** reasonable degree of scientific certainty.
 14:43:33 **24** Again, I'm not looking at this in a
 14:43:36 **25** vacuum. If you have the amphibole d-spacing,
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14:43:39 **1** you have the appropriate chemistry. In these
 14:43:41 **2** cases they did zone axis for these particular
 14:43:44 **3** samples, for these two samples, so zone axis for
 14:43:52 **4** 1 and 2.
 14:43:55 **5** So, you know, I don't know how many
 14:43:58 **6** nonamphiboles are out there, but there's nothing
 14:44:02 **7** that I'm aware of if you're looking at all the
 14:44:04 **8** appropriate information and not looking at this
 14:44:07 **9** in a vacuum. None of this has ever -- you've
 14:44:10 **10** got to understand, none of this is ever done in
 14:44:12 **11** a vacuum. It's coupled with the chemistry,
 14:44:14 **12** coupled with the morphology, and also we have a
 14:44:16 **13** pretty good idea of what kind of matrix it's in.
 14:44:20 **14** Q. (By Mr. Chachkes) Okay.
 14:44:21 **15** A. **It's cosmetic talc.**
 14:44:22 **16** Q. So, I'm sorry, the methods you use to
 14:44:26 **17** identify asbestos are -- there's TEM, there's XRD,
 14:44:34 **18** and there's PLM. Are those the three, the big three?
 14:44:38 **19** A. **Those are the -- really the only ones**
 14:44:41 **20 is -- yeah, XRD is used, but the big two are TEM and**
 14:44:47 **21 PLM.**
 14:44:47 **22** Q. Okay. So is there anything in the
 14:44:52 **23** published scientific literature, peer-reviewed, that
 14:44:55 **24** says you can take an analysis under each of TEM, XRD,
 14:45:00 **25** and PLM, none of which conclusively point to a
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14:45:04 **1** regulated asbestos, but together you can determine
 14:45:07 **2** that it's a regulated asbestos?
 14:45:09 **3** MR. CIRSCH: Object to form.
 14:45:10 **4** THE WITNESS: Well, you're wrong about
 14:45:18 **5** this. XRD cannot point to anything. Can't tell
 14:45:21 **6** you if it's fibrous or not.
 14:45:24 **7** Polarized light microscopy by itself can
 14:45:26 **8** tell you if you have regulated asbestos.
 14:45:29 **9** Transmission electron microscopy itself can tell
 14:45:31 **10** you if it's regulated asbestos.
 14:45:34 **11** Both techniques have their strengths and
 14:45:38 **12** their weaknesses. This type of analysis, in my
 14:45:41 **13** opinion, needs the suite of techniques: the PLM,
 14:45:48 **14** the Blount PLM, and TEM.
 14:45:51 **15** For Vermont and Italian talc, I don't
 14:45:54 **16** think XRD serves any useful purpose.
 14:45:56 **17** Q. (By Mr. Chachkes) Okay. Let's just ask
 14:45:58 **18** the question again.
 14:46:00 **19** Now, the assumption of the hypothetical is
 14:46:02 **20** that your TEM result independently does not
 14:46:07 **21** conclusively point to a regulated asbestos, that your
 14:46:11 **22** XRD independently, that is, independent of the other
 14:46:14 **23** analyses, does not conclusively point to a regulated
 14:46:17 **24** asbestos, and that your PLM, similarly, independently
 14:46:20 **25** does not point to a regulated asbestos.
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14:46:22 **1** Can those three together conclusively
14:46:28 **2** point to a regulated asbestos --
14:46:31 **3** MR. CIRSCH: Object to form.
14:46:32 **4** **Q.** (By Mr. Chachkes) -- each one making up
14:46:33 **5** for the other's defects, in a way?
14:46:36 **6** MR. CIRSCH: Object to form.
14:46:36 **7** THE WITNESS: Well, there's no defects
14:46:38 **8** like you state. I can't answer a question where
14:46:40 **9** you're saying if all three are negative or
14:46:42 **10** nondetects, because it's either nondetect or you
14:46:45 **11** have identified the regulated asbestos.
14:46:47 **12** So if you're telling me I have three
14:46:49 **13** nondetects, then, no, I can't point to any
14:46:52 **14** regulated asbestos in three nondetects.
14:46:54 **15** **Q.** (By Mr. Chachkes) Okay.
14:46:55 **16** **A.** **Before you start, we've been going over an**
14:46:57 **17** **hour. Can we go off the record?**
14:46:59 **18** **Q.** Can I maybe ask a couple more questions on
14:47:01 **19** the same line, and I'll finish it up, if that's okay?
14:47:03 **20** **A.** **If you insist.**
14:47:04 **21** **Q.** I don't do this that often but --
14:47:06 **22** **A.** **That's fine.**
14:47:07 **23** **Q.** It's fascinating science.
14:47:09 **24** Okay. So we agreed that the single zone
14:47:16 **25** axis SAED pattern in a vacuum didn't point to
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14:47:18 **1** asbestos, right, even though you're saying it's
14:47:20 **2** asbestos; right?
14:47:22 **3** MR. CIRSCH: Object to form.
14:47:23 **4** THE WITNESS: I don't think we agreed to
14:47:24 **5** that. It depends on the zone that you get. If
14:47:28 **6** you were to sit down and just look at that by
14:47:32 **7** itself, a 302, you could probably eliminate a
14:47:36 **8** lot.
14:47:37 **9** But based with all the other information,
14:47:39 **10** if the zone axis -- if you're getting a zone
14:47:42 **11** axis, that means you have something that you got
14:47:44 **12** a zone axis off of.
14:47:45 **13** **Q.** (By Mr. Chachkes) Right.
14:47:47 **14** **A.** **But you're asking this hypothetical in a**
14:47:47 **15** **vacuum. That's not what we do. I can't -- I've not**
14:47:52 **16** **sat down and tried since graduate school where they**
14:47:54 **17** **give you a mineral and just give you XRD pattern and**
14:47:57 **18** **say go identify it. It's not something that we would**
14:48:01 **19** **ever do for any of these analyses without the**
14:48:03 **20** **morphology and without the chemistry.**
14:48:07 **21** **Q.** Okay. Last question. I'll ask it one
14:48:11 **22** more time because I don't think I've gotten the
14:48:13 **23** answer. If you want to give the same answer, it's
14:48:16 **24** fine, but I'm giving you the opportunity to answer
14:48:18 **25** this.
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14:48:19 **1** If I had a single crystal, I had a TEM
14:48:21 **2** analysis that in a vacuum could point to many things,
14:48:25 **3** not just asbestos, an XRD that could point to many
14:48:29 **4** things, not just asbestos, and in a vacuum PLM that
14:48:32 **5** could point to many things, not just asbestos, is
14:48:35 **6** there any published peer-reviewed literature that I
14:48:38 **7** can look at that says that's a situation where you
14:48:41 **8** can combine the three and say that indeed is
14:48:43 **9** asbestos?
14:48:44 **10** MR. CIRSCH: Object to form.
14:48:45 **11** THE WITNESS: I can't answer a
14:48:46 **12** hypothetical that would never happen in a
14:48:49 **13** working real lab that does this analysis. You
14:48:51 **14** wouldn't sit there and go, I've run these three
14:48:53 **15** and I have no clue what it is, now I'm going to
14:48:57 **16** combine it all together and say, gee, that's
14:48:58 **17** going to tell me.
14:48:59 **18** I can't answer that hypothetical.
14:49:03 **19** Somebody else will have to wade through that
14:49:05 **20** one.
14:49:06 **21** MR. CHACHKES: Okay. Let's take a break.
14:49:08 **22** THE WITNESS: Thank you.
14:49:08 **23** (Recess from 2:49 p.m. to 3:07 p.m.)
15:07:57 **24** **Q.** (By Mr. Chachkes) So Dr. Longo, in your
15:09:18 **25** diffraction verification documents, sometimes the
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15:09:25 **1** bottom -- that's not a good example.
15:09:30 **2** Let's look at Exhibit 16, and let's look
15:09:38 **3** at the first verification page. Sometimes in the
15:09:41 **4** lower left, as we discussed, the zone axis
15:09:44 **5** information is just not -- there's nothing filled in
15:09:47 **6** there; right?
15:09:47 **7** **A.** **Correct.**
15:09:47 **8** **Q.** If it's blank, does that mean that this
15:09:54 **9** particular image was not taken at a zone axis?
15:09:57 **10** **A.** **That is correct.**
15:09:58 **11** **Q.** Does MAS maintain nonasbestiform reference
15:10:06 **12** samples for tremolite?
15:10:08 **13** **A.** **Well, yes and no. Most -- tremolite**
15:10:15 **14** **standard has both. If you go to the one I brought --**
15:10:26 **15** **and when we say nonasbestiform, we're saying it's not**
15:10:31 **16** **meeting the 5-to-1 aspect ratio. That's less. It**
15:10:36 **17** **certainly still could be asbestiform since it's**
15:10:39 **18** **fibrous, but those we do not count in our analysis**
15:10:46 **19** **using the TEM protocols, which are the standard**
15:10:50 **20** **methods for scientists to identify asbestos. And you**
15:10:54 **21** **can understand, these protocols are all heavily**
15:10:55 **22** **vetted and peer-reviewed.**
15:11:03 **23** **For example, my ASTM D5755 method took six**
15:11:07 **24** **years to get it through the 125 scientists. And all**
15:11:07 **25** **these methods have been published in the**
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15:11:10 **1** peer-reviewed literature since any time anybody
15:11:14 **2** publishes anything on the measurement of asbestos,
15:11:16 **3** they will reference one of these protocols.
15:11:19 **4** Q. Do you remember what my original question
15:11:22 **5** was? So the question was do you have -- so let's
15:11:24 **6** make it easier.
15:11:25 **7** Do you have a bottle of nonasbestiform
15:11:27 **8** tremolite at MAS?
15:11:29 **9** MR. CIRSCH: Object to form.
15:11:30 **10** THE WITNESS: I'm not sure a bottle of
15:11:32 **11** nonasbestiform tremolite actually exists. You
15:11:34 **12** typically find both. Somebody may call it
15:11:37 **13** nonasbestiform; but when you go look through it,
15:11:40 **14** or they say it's asbestos, you'll find
15:11:42 **15** structures that are less than the 5-to-1 aspect
15:11:47 **16** ratio. We don't count those.
15:11:49 **17** Q. (By Mr. Chachkes) Do you have a bottle at
15:11:52 **18** MAS of nonasbestos -- of tremolite where, on average,
15:11:56 **19** its aspect ratio is below 5-to-1?
15:11:59 **20** MR. CIRSCH: Object to form.
15:12:00 **21** THE WITNESS: I'm not sure any such thing
15:12:02 **22** exists. We don't have what doesn't exist.
15:12:05 **23** Q. (By Mr. Chachkes) Okay. Do you have a
15:12:06 **24** bottle in your office of anthophyllite where the
15:12:11 **25** aspect ratio of the anthophyllite is all underneath
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15:12:14 **1** 5-to-1?
15:12:15 **2** MR. CIRSCH: Object to form.
15:12:16 **3** THE WITNESS: No. You have them that have
15:12:19 **4** a range of aspect ratios, less than 5-to-1,
15:12:23 **5** greater than 5-to-1. The average is typically
15:12:25 **6** above 5-to-1.
15:12:26 **7** Q. (By Mr. Chachkes) Okay. So you don't
15:12:27 **8** have a bottle in your office of an amphibole that has
15:12:37 **9** aspect ratios averaging under 5-to-1?
15:12:41 **10** MR. CIRSCH: Object to form.
15:12:42 **11** THE WITNESS: No. All the bottles with
15:12:44 **12** standards we have are actual asbestos, but they
15:12:46 **13** do have a portion that are below 5-to-1.
15:12:48 **14** Q. (By Mr. Chachkes) And that's because it's
15:12:50 **15** a big bell curve and some of that bell curve is over
15:12:53 **16** on the less than 5-to-1 and some of it is on the
15:12:55 **17** right?
15:12:55 **18** A. That's correct. The NIST standard for
15:12:58 **19** tremolite, I think the average -- even with the less
15:13:00 **20** than 5-to-1, greater than 5-to-1, is around 10.
15:13:04 **21** Q. Is your opinion that there's literature
15:13:13 **22** supporting your position that you always find both
15:13:16 **23** asbestiform and nonasbestiform amphiboles together?
15:13:19 **24** A. I believe so.
15:13:20 **25** Q. Can you tell me --
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15:13:22 **1** A. I can't tell you right now. I mean,
15:13:24 **2** sometimes I anticipate cross-exam -- you know,
15:13:28 **3** discovery depositions, but I'm not aware of any that
15:13:32 **4** somebody states this is all, quote, nonasbestiform or
15:13:35 **5** all cleavage fragments.
15:13:38 **6** Q. Okay.
15:13:38 **7** A. What I see -- and I'll have to dig it
15:13:40 **8** up -- is that if you have one, you have the other.
15:13:42 **9** Q. And you don't cite any such literature in
15:13:45 **10** your expert report, do you?
15:13:47 **11** A. No, sir, I'm not making the claim that --
15:13:52 **12** what I'm doing in my expert report is saying here's
15:13:55 **13** what we measured using the standard TEM, well-vetted
15:14:00 **14** protocols for the identification of regulated
15:14:02 **15** asbestos.
15:14:02 **16** Q. Do you remember the question was about
15:14:03 **17** whether --
15:14:04 **18** MR. CIRSCH: I don't know if he finished
15:14:05 **19** the answer yet.
15:14:06 **20** Q. (By Mr. Chachkes) Yeah. Do you remember
15:14:08 **21** the question?
15:14:08 **22** MR. CIRSCH: I --
15:14:08 **23** THE WITNESS: I remember --
15:14:12 **24** THE REPORTER: One at a time.
15:14:12 **25** THE WITNESS: I remember the question, but
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15:14:14 **1** the answer is it's not something that I was
15:14:16 **2** relying on for my identification of regulated
15:14:18 **3** asbestos. I'm relying on the peer-reviewed
15:14:22 **4** publications for the standard TEM methods and
15:14:26 **5** standard PLM methods.
15:14:27 **6** Q. (By Mr. Chachkes) Do you have a standard
15:14:28 **7** in your lab of an SAED readout for an amphibole with
15:14:35 **8** ratios of less than 5-to-1 aspect ratios?
15:14:39 **9** MR. CIRSCH: Object to form.
15:14:46 **10** Q. (By Mr. Chachkes) So I'm not asking
15:14:47 **11** whether you have incidentally such a thing but a
15:14:49 **12** standard that you use to compare against?
15:14:52 **13** A. Well, no, there's nothing to compare. The
15:14:56 **14** less than 5-to-1 aspect ratio versus greater than
15:14:59 **15** 5-to-1 aspect ratio will have the identical
15:15:02 **16** d-spacings and identical diffraction patterns.
15:15:05 **17** There's no difference in a, quote, less than 5-to-1
15:15:08 **18** and greater than 5-to-1. You just will have the
15:15:12 **19** exact same type of patterns for d-spacing, and if you
15:15:14 **20** were to do a zone axis, you'll have the same zone
15:15:18 **21** axis.
15:15:18 **22** Q. Okay. So it's your opinion that for SAED,
15:15:20 **23** a single nonasbestiform tremolite crystal and a
15:15:24 **24** single asbestiform tremolite crystal will have the
15:15:28 **25** same SAED patterns?
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15:15:31 **1** MR. CIRSCH: Object to form.

15:15:32 **2** THE WITNESS: Yes.

15:15:32 **3** **Q.** (By Mr. Chachkes) Okay. Is the same true

15:15:33 **4** for EDXA?

15:15:34 **5** **A.** **It is.**

15:15:34 **6** **Q.** Is the same true that the PLM will look

15:15:38 **7** the same for an asbestiform fragment and a

15:15:41 **8** nonasbestiform fragment of tremolite?

15:15:44 **9** **A.** **Well, let's be clear. I'm not calling it**

15:15:47 **10** **asbestiform and nonasbestiform. I'm calling it --**

15:15:49 **11** **for the 22262-1, it's materials that are less than**

15:15:54 **12** **3-to-1 aspect ratio. They'll have the same**

15:16:00 **13** **refractive indices, same information.**

15:16:03 **14** **There's no difference in the crystalline**

15:16:04 **15** **structure between what's less than 5-to-1 or less**

15:16:08 **16** **than whatever the aspect ratio is for a particular**

15:16:11 **17** **method that you're using. There's no difference.**

15:16:14 **18** **That's how you either count greater than**

15:16:17 **19** **or equal to 5-to-1 aspect ratio for TEM. Or in the**

15:16:22 **20** **PLM we're looking at bundles that typically are -- I**

15:16:26 **21** **think all of them were -- the individual fibers and**

15:16:28 **22** **the bundles were greater than 20-to-1.**

15:16:31 **23** **Where we draw the line is in the method**

15:16:34 **24** **when it says anything less than 3-to-1 is not**

15:16:36 **25** **counted. And that's what we do. We call them**

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15:16:38 **1** **cleavage fragments.**

15:16:39 **2** **Q.** Have you ever heard anyone distinguishing

15:16:41 **3** asbestiform and nonasbestiform tremolite by virtue of

15:16:44 **4** whether it has parallel fibers?

15:16:48 **5** MR. CIRSCH: Object to form.

15:16:49 **6** THE WITNESS: Yes. If it is a bundle, by

15:16:52 **7** definition, it is asbestiform. Both Ann Wylie

15:16:56 **8** and both the 22262-1 and the R-93 as well as --

15:17:02 **9** and TEM's different. You take the overall

15:17:05 **10** aspect ratio of a bundle width to length.

15:17:09 **11** That's how we distinguish between a regulated

15:17:13 **12** asbestos fiber and not. But even in TEM, if it

15:17:15 **13** is a bundle, hence it is asbestiform.

15:17:17 **14** **Q.** (By Mr. Chachkes) Okay. Would the SAED

15:17:19 **15** pattern for tremolite with parallel fibers and

15:17:22 **16** tremolite that does not exhibit parallel fibers be

15:17:26 **17** the same?

15:17:27 **18** **A.** **Yes.**

15:17:28 **19** **Q.** Okay. Same --

15:17:29 **20** **A.** **For the right orientation, same**

15:17:31 **21** **orientation, yeah. Yes.**

15:17:32 **22** **Q.** What about on all three orientations?

15:17:35 **23** **A.** **I haven't done it on all three**

15:17:37 **24** **orientations because we don't count those if it has**

15:17:40 **25** **less than the counting aspects, and we typically only**

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15:17:43 **1** **do d-spacings following the peer-reviewed published**

15:17:46 **2** **protocols.**

15:17:47 **3** **Q.** Okay. Do you have any opinion on whether

15:17:50 **4** a tremolite with parallel fibers and a tremolite that

15:17:53 **5** does not have parallel fibers would indeed have

15:17:56 **6** identical d-spacings on all three axes for SAED?

15:18:03 **7** **A.** **We haven't done three-axis SAEDs for**

15:18:08 **8** **something that is not counted as a regulated asbestos**

15:18:11 **9** **fiber. Single individual fibers will have the same**

15:18:16 **10** **d-spacing range, will have the same selected area**

15:18:20 **11** **electron diffraction zone axis if you go to the**

15:18:23 **12** **particular orientation.**

15:18:25 **13** **Q.** So I'm going to ask again because my

15:18:29 **14** question's only about -- it's not about what you've

15:18:30 **15** done, it's about what something looks like.

15:18:37 **16** Does the SAED for tremolite that has

15:18:39 **17** parallel fibers look exactly the same on three axes

15:18:44 **18** as a tremolite that does not have parallel fibers?

15:18:48 **19** MR. CIRSCH: Object to form.

15:18:49 **20** **Q.** (By Mr. Chachkes) Putting aside whether

15:18:51 **21** you've done it or not, as a matter of science, are

15:18:54 **22** they the same? You can say you don't know, but I

15:18:56 **23** need that question answered.

15:18:57 **24** MR. CIRSCH: Object to form.

15:18:58 **25** THE WITNESS: It should be the same. But

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15:18:59 **1** it's not something that we do, because it's not

15:19:01 **2** part of the peer-reviewed published standard

15:19:04 **3** protocols. When it is -- when it is not

15:19:10 **4** parallel sides or it doesn't meet the 5-to-1

15:19:12 **5** aspect ratio, it is not recorded.

15:19:15 **6** **Q.** (By Mr. Chachkes) Do you know of any

15:19:17 **7** published literature that confirms that they should

15:19:20 **8** be the same?

15:19:21 **9** **A.** **It's not -- I believe so, yes.**

15:19:35 **10** **Q.** What?

15:19:35 **11** **A.** **Again, it has to do with surface charts.**

15:19:41 **12** **I don't recall the citation.**

15:19:42 **13** **Q.** Okay. Sitting here today you can't give

15:19:44 **14** me a citation for that?

15:19:45 **15** **A.** **No, sir, I did not anticipate that we were**

15:19:48 **16** **going to be debating non -- debating asbestos**

15:19:54 **17** **minerals that we don't count or don't put into our**

15:19:58 **18** **report.**

15:19:58 **19** **Q.** Okay. What about under PLM, does a

15:20:03 **20** tremolite that has parallel fibers look the same

15:20:07 **21** under PLM as a tremolite that does not have parallel

15:20:11 **22** fibers?

15:20:11 **23** **A.** **No.**

15:20:12 **24** **Q.** What about TEM when you're looking at just

15:20:15 **25** morphology, do the two look the same?

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15:20:18 **1 A. If it's not parallel, it's not going to**
 15:20:20 **2 look the same. If it's PLM and you can't see the**
 15:20:22 **3 individual fibers in the bundles, it's not going to**
 15:20:25 **4 look the same.**
 15:20:25 **5 Q.** Okay. Do you have a standard reference
 15:20:28 **6** standard for PLM for tremolite that does not have
 15:20:35 **7** parallel fibers?
 15:20:36 **8 A. And again, I guess we're going back to a**
 15:20:39 **9 bottle of cleavage fragments. No. But we do**
 15:20:42 **10 routinely see tremolite/actinolite cleavage fragments**
 15:20:48 **11 that are less than 3-to-1 aspect ratio that is**
 15:20:51 **12 recorded in -- and they have the same properties that**
 15:20:55 **13 give us the refractive indices and identification.**
 15:20:57 **14 Otherwise, you wouldn't be able to identify it.**
 15:20:59 **15 Q.** Do you have a standard TEM photograph
 15:21:03 **16** showing morphology that is for tremolite that does
 15:21:08 **17** not exhibit parallel fibers?
 15:21:12 **18 A. I don't know if we have recorded typical**
 15:21:17 **19 nonparallel sides on a TEM structure that has the**
 15:21:22 **20 same chemistry, but we do not record any of our**
 15:21:26 **21 analyses as per the peer-reviewed published**
 15:21:30 **22 protocols.**
 15:21:31 **23 Q.** Okay. Would your answers be the same for
 15:21:36 **24** anthophyllite?
 15:21:36 **25 A. It would be the same.**
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15:21:38 **1 Q.** Okay. For all those questions whether you
 15:21:40 **2** keep the separate standard?
 15:21:42 **3** MS. O'DELL: Object to the form.
 15:21:44 **4** THE WITNESS: If -- we don't keep a
 15:21:45 **5** separate standard because we do not record
 15:21:49 **6** amphibole structures that have the same
 15:21:51 **7** chemistry, same diffraction pattern types, that
 15:21:55 **8** are not part of the counting protocols for these
 15:21:58 **9** peer-reviewed protocols for the analysis.
 15:22:01 **10 Q.** (By Mr. Chachkes) Taking you back to your
 15:22:05 **11** November reports, your November 14 reports, it's my
 15:22:09 **12** understanding that in it you confirmed that -- that
 15:22:28 **13** in it you confirm that the SAED confirmed regulated
 15:22:33 **14** asbestos; is that correct?
 15:22:35 **15** MR. CIRSCH: Object to form.
 15:22:36 **16** THE WITNESS: We confirmed that the -- I
 15:22:42 **17** don't believe we said it like that. What we
 15:22:44 **18** confirmed is following the peer-reviewed
 15:22:48 **19** published protocols, either for TEM or polarized
 15:22:53 **20** light microscopy using the methodology that
 15:22:56 **21** takes you through the steps to determine if it's
 15:22:59 **22** regulated asbestos, primarily the counting rule,
 15:23:02 **23** the chemistry, and the crystalline structure.
 15:23:05 **24** That's why they have all three. None of this is
 15:23:08 **25** done in a vacuum. That's what we did.
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15:23:11 **1 Q.** (By Mr. Chachkes) Let me just ask you the
 15:23:15 **2** straight question. Did your November report confirm
 15:23:17 **3** that SAED patterns confirmed regulated asbestos in
 15:23:21 **4** J&J bottles of talc?
 15:23:25 **5** MR. CIRSCH: Object to form.
 15:23:25 **6** THE WITNESS: I'd have to see the context
 15:23:27 **7** because it has to be all the information that's
 15:23:30 **8** done. Regulated asbestos goes with the counting
 15:23:34 **9** rules, that's the first -- counting rules on the
 15:23:36 **10** structure, parallel sides, the diffraction
 15:23:40 **11** pattern, and the chemistry. That's how the
 15:23:43 **12** protocol says to do this. Not just an SAED by
 15:23:48 **13** itself, not an EDS by itself, and not the
 15:23:52 **14** morphology by itself. You have to use all three
 15:23:55 **15** for TEM analysis. That's how the protocol goes.
 15:24:03 **16** MR. CHACHKES: Okay. Let me ask you in
 15:24:04 **17** this way. Let's mark this next exhibit.
 15:24:23 **18** (Defendants' Exhibit 18 was marked for
 15:24:23 **19** identification.)
 15:24:23 **20 Q.** (By Mr. Chachkes) So can you confirm that
 15:24:25 **21** Exhibit 18 is one of your SAEDs?
 15:24:29 **22** MR. CIRSCH: On the back of here I see
 15:24:30 **23** some -- okay.
 15:24:30 **24** MS. TROVATO: On the back -- sorry.
 15:24:30 **25** MR. CHACHKES: Here. Take mine.
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15:24:32 **1** MR. CIRSCH: I wanted to make sure that
 15:24:32 **2** you --
 15:24:38 **3 Q.** (By Mr. Chachkes) So can you confirm
 15:24:41 **4** Exhibit 18 is of your SAED patterns?
 15:24:46 **5** MS. O'DELL: Would you direct us? Is
 15:24:47 **6** there a specific page in his November report
 15:24:48 **7** that you're referring to?
 15:24:50 **8** THE WITNESS: I see it right here. It's
 15:24:51 **9** the M68233-001-001, which matches the M number
 15:25:00 **10** and fiber number. It says that we -- date of
 15:25:04 **11** photo was 2/14/2018. So that is one of our
 15:25:09 **12** diffraction patterns.
 15:25:10 **13 Q.** (By Mr. Chachkes) Okay. Does this
 15:25:14 **14** confirm that there is anthophyllite in J&J talc,
 15:25:21 **15** Exhibit 18 alone?
 15:25:23 **16 A. You keep saying alone, and you keep saying**
 15:25:26 **17 in a vacuum. That's not how it's done. The**
 15:25:30 **18 methodology doesn't say take the SAED alone. We have**
 15:25:34 **19 the chemistry that goes with it and the morphology.**
 15:25:36 **20 There's a reason it takes you through those steps.**
 15:25:39 **21 Q.** Okay. So the question is does Exhibit 18
 15:25:45 **22** alone confirm anthophyllite?
 15:25:49 **23** MR. CIRSCH: Object.
 15:25:50 **24 Q.** (By Mr. Chachkes) It's just yes or no.
 15:25:50 **25** MR. CIRSCH: It's not yes or no.
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15:25:51 **1** THE WITNESS: It's not yes or no. It's --
 15:25:54 **2** again, my answer is you do not look at these
 15:25:57 **3** patterns alone. You're using a peer-reviewed
 15:26:01 **4** published protocol that walks you through
 15:26:04 **5** morphology, EDXA, and a diffraction pattern.
 15:26:09 **6** That's how the protocol goes.
 15:26:11 **7** It's not my protocol. These are the
 15:26:13 **8** protocols for the ISO methods, for the AHERA
 15:26:16 **9** methods, the ASTM -- TEM methods. There is a
 15:26:19 **10** reason you do all of them.
 15:26:21 **11** Q. (By Mr. Chachkes) Right. So it's my
 15:26:23 **12** understanding that this is an answerable question.
 15:26:25 **13** If you say it's completely unanswerable, tell me.
 15:26:30 **14** And I understand you don't like it when I've asked
 15:26:32 **15** you about something in a vacuum, but the question
 15:26:34 **16** stands. In a vacuum, Exhibit 18, is that a uniquely
 15:26:37 **17** anthophyllite pattern?
 15:26:37 **18** MR. CIRSCH: Object to form. That's been
 15:26:39 **19** asked and answered.
 15:26:40 **20** THE WITNESS: And my answer stands.
 15:26:41 **21** Q. (By Mr. Chachkes) Okay. And that
 15:26:43 **22** answer's what? If you're not going to answer, just
 15:26:48 **23** tell me.
 15:26:48 **24** MS. O'DELL: He's already answered.
 15:26:48 **25** MR. CIRSCH: He's already answered the
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15:26:51 **1** question.
 15:26:51 **2** THE WITNESS: My answer stands. The
 15:26:53 **3** previous answer.
 15:26:53 **4** Q. (By Mr. Chachkes) Okay. Now, I'm looking
 15:26:54 **5** at Exhibit 17, which I believe corresponds to this;
 15:26:58 **6** right?
 15:26:58 **7** A. **Yes.**
 15:26:59 **8** Q. Okay. Page 1 of the -- the first
 15:27:03 **9** verification, it shows date verified as 2/14. Do you
 15:27:07 **10** see that?
 15:27:07 **11** A. **Correct.**
 15:27:08 **12** Q. That means on the same day of the photo
 15:27:12 **13** you actually put this picture into the software to
 15:27:14 **14** determine the d-spacing; correct?
 15:27:16 **15** A. **That's correct.**
 15:27:17 **16** Q. Okay. For many of the SAED patterns that
 15:27:21 **17** have been produced in this case, the verification
 15:27:24 **18** came after your November report; correct?
 15:27:27 **19** A. **That's correct.**
 15:27:27 **20** Q. Some of them came after -- came as late as
 15:27:33 **21** January; right?
 15:27:33 **22** A. **That may be possible.**
 15:27:34 **23** Q. Okay. So you were using, for the purposes
 15:27:36 **24** of at least the November report, some of the EDSA
 15:27:41 **25** patterns you had not run d-spacing on?
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15:27:44 **1** MR. CIRSCH: Object to form.
 15:27:45 **2** THE WITNESS: That's correct. Well, we
 15:27:46 **3** had taken the data, and the photograph was
 15:27:50 **4** taken. You know, when the verification came
 15:27:52 **5** through, it may have been done later.
 15:27:54 **6** Q. (By Mr. Chachkes) Yeah, and I might have
 15:27:56 **7** misspoke.
 15:27:56 **8** So what I'm saying is that for some of the
 15:27:58 **9** samples in the November report, you had not run the
 15:28:01 **10** d-spacing for the SAED; is that correct?
 15:28:04 **11** A. **That's possible.**
 15:28:05 **12** Q. Okay. Is the d-spacing important to
 15:28:08 **13** determining whether SAED is pointing towards a
 15:28:11 **14** regulated asbestos?
 15:28:13 **15** MR. CIRSCH: Object to form.
 15:28:14 **16** THE WITNESS: It's all important. If you
 15:28:16 **17** do this long enough, you can look at it and say
 15:28:18 **18** that's an amphibole diffraction pattern. But
 15:28:20 **19** the verification just solidifies it.
 15:28:23 **20** Q. (By Mr. Chachkes) Okay. Why did you run
 15:28:30 **21** verifications after your first report and as late as
 15:28:36 **22** January for SAED verifications?
 15:28:41 **23** MR. CIRSCH: Object to form.
 15:28:42 **24** THE WITNESS: Because they've all been
 15:28:44 **25** taken, just getting to them. Certainly if it
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15:28:46 **1** didn't verify it, then we'd have something else
 15:28:49 **2** to talk about today.
 15:28:50 **3** Q. (By Mr. Chachkes) How many particles did
 15:29:02 **4** your analyst conduct zone axis determinations on?
 15:29:05 **5** MR. CIRSCH: Object to form.
 15:29:06 **6** THE WITNESS: How many fibrous structures?
 15:29:08 **7** Q. (By Mr. Chachkes) Yes.
 15:29:09 **8** A. **I haven't counted them up.**
 15:29:10 **9** Q. Could it be about a dozen?
 15:29:12 **10** MR. CIRSCH: Object to form.
 15:29:13 **11** THE WITNESS: Again, I haven't counted
 15:29:14 **12** them up.
 15:29:15 **13** Q. (By Mr. Chachkes) Okay. And earlier we
 15:29:18 **14** talked about how it's difficult to distinguish talc
 15:29:24 **15** and anthophyllite with EDXA; right?
 15:29:30 **16** MR. CIRSCH: Object to form.
 15:29:31 **17** THE WITNESS: I didn't say it was
 15:29:32 **18** difficult. What I said was you would not
 15:29:35 **19** identify it by just EDXA. You would use the
 15:29:38 **20** procedures in place, all the procedures, to make
 15:29:41 **21** that determination if you have fibrous talc
 15:29:44 **22** versus anthophyllite.
 15:29:44 **23** Q. (By Mr. Chachkes) And when you say all
 15:29:45 **24** the procedures, you mean procedures above and beyond
 15:29:47 **25** EDXA?
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15:29:48 **1 A. Procedures that are stated in the**
15:29:52 **2 peer-reviewed protocols that we use.**
15:29:54 **3 Q.** That are above and beyond EDXA?
15:29:57 **4 MR. CIRSCH:** Object to form.
15:29:59 **5 THE WITNESS:** Well, they're all above and
15:30:02 **6 beyond EDXA. None of this is done in a vacuum.**
15:30:05 **7 No analyst is just looking at the EDXA and not**
15:30:06 **8 following the protocols as published in the**
15:30:07 **9 peer-reviewed literature for making these**
15:30:09 **10 determinations.**
15:30:10 **11 Q.** (By Mr. Chachkes) You were saying that a
15:30:11 **12 way to tell the difference between talc and**
15:30:15 **13 anthophyllite in SAED is to tilt the goniometer --**
15:30:27 **14 A. Goniometer.**
15:30:28 **15 Q.** -- goniometer; is that right?
15:30:30 **16 A. That's correct.**
15:30:31 **17 Q.** Okay. In every instance -- are there
15:30:41 **18 instances where you looked at a particle for a J&J**
15:30:47 **19 sample in the MDL and tilted the gon --**
15:30:56 **20 A. Goniometer.**
15:30:56 **21 Q.** -- goniometer and determined, oh, well,
15:30:58 **22 that's talc?**
15:30:59 **23 A. That's certainly possible.**
15:31:06 **24 Q.** Okay. Is it that you don't know because
15:31:09 **25 your analyst would have done it and not reported that**
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15:31:11 **1 to you?**
15:31:12 **2 MR. CIRSCH:** Object to form.
15:31:12 **3 THE WITNESS:** Well, we were only taking a
15:31:14 **4 random talc verification of some of these for**
15:31:17 **5 one fiber, it's at the end of the -- each of the**
15:31:21 **6 analyses where there was fibrous talc present in**
15:31:24 **7 the TEM, there is an SAED, EDS, and a picture**
15:31:30 **8 showing the morphology.**
15:31:31 **9 These particular ones are not talc. These**
15:31:36 **10 are zone axis. This happens to be the**
15:31:41 **11 historical 1978 that was produced through**
15:31:47 **12 Lanier, and these zone axis orientations are not**
15:31:52 **13 what the so-called look-alike zone axis for the**
15:31:57 **14 talc fiber.**
15:31:59 **15 Q.** (By Mr. Chachkes) I'm sorry, you're
15:32:00 **16 saying that what's in Exhibit 17 are non-MDL samples?**
15:32:06 **17 A. No, it is an MDL sample. I said it is an**
15:32:08 **18 MDL sample.**
15:32:09 **19 Q.** Oh, okay. When you said produced through
15:32:11 **20 Lanier, I didn't understand what you meant there.**
15:32:14 **21 A. Well, it went to Lanier and went to us.**
15:32:18 **22 Q.** Okay.
15:32:18 **23 A. The 1978 --**
15:32:21 **24 Q.** Got it.
15:32:25 **25 A. -- two samples for one container. I think**
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15:32:25 **1 it's JBP-084.**
15:32:31 **2 Q.** Earlier we talked about how cummingtonite
15:32:39 **3 and anthophyllite have the same chemistry; do you**
15:32:42 **4 remember that?**
15:32:42 **5 A. Yes.**
15:32:42 **6 Q.** One way to tell them apart is to determine
15:32:45 **7 the crystal system of the particle?**
15:32:47 **8 A. Correct. You could go in and do zone axis**
15:32:50 **9 and get a monoclinic versus the orthorhombic.**
15:32:53 **10 Q.** Okay. So anthophyllite is orthorhombic,
15:32:56 **11 and cummingtonite is monoclinic?**
15:32:59 **12 A. That is correct.**
15:32:59 **13 Q.** Okay. Did you do the analysis to
15:33:03 **14 determine whether what you were looking at and**
15:33:07 **15 thought might be anthophyllite to see whether it was**
15:33:10 **16 monoclinic and thus cummingtonite?**
15:33:12 **17 A. No, we don't do that. We just call it the**
15:33:15 **18 anthophyllite solid solution series since both**
15:33:18 **19 anthophyllite, cummingtonite, and grunerite are**
15:33:22 **20 regulated asbestos.**
15:33:22 **21 Q.** Okay.
15:33:23 **22 A. There's no -- unless you want to do that**
15:33:26 **23 for some reason, there's no need to go any further.**
15:33:28 **24 Q.** Okay. So everything in your expert report
15:33:31 **25 that you identify as anthophyllite could very well be**
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15:33:36 **1 cummingtonite, but your position it doesn't matter?**
15:33:39 **2 MR. CIRSCH:** Object to form.
15:33:40 **3 THE WITNESS:** Well, everything could be
15:33:42 **4 anthophyllite and it still doesn't matter. You**
15:33:45 **5 know, if you use the analogy, well, I found the**
15:33:48 **6 weed and it's a particular weed that is a**
15:33:50 **7 problem and we need to get rid of it, now I want**
15:33:53 **8 to go look and see what color roots it has**
15:33:55 **9 because the weed itself all looks the same.**
15:33:58 **10 This particular one, these zone axes are**
15:34:00 **11 anthophyllite for, I believe, in these two --**
15:34:05 **12 this was the one that Dr. Sanchez says was**
15:34:08 **13 cummingtonite, and so we went back and did zone**
15:34:11 **14 axis just some time ago. And actually, these**
15:34:14 **15 two structures are in fact anthophyllite.**
15:34:17 **16 Q.** (By Mr. Chachkes) You mean you do zone
15:34:19 **17 axis to determine whether it was orthorhombic or**
15:34:22 **18 monoclinic?**
15:34:23 **19 A. Well, we did zone axis to make sure that**
15:34:25 **20 it was orthorhombic and had the reflections, that it**
15:34:28 **21 had the crystalline orientation specific for**
15:34:30 **22 orthorhombic anthophyllite.**
15:34:32 **23 Q.** Did you produce the material that shows
15:34:33 **24 that sample to be orthorhombic?**
15:34:36 **25 A. Number 17.**
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15:34:37 **1** Q. That's number 17? Okay.
15:34:40 **2** A. **The first one, especially. I know for the**
15:34:42 **3 301.**
15:34:44 **4** Q. And for the other -- it's fair to say that
15:34:50 **5** most of the particles in this case that you've
15:34:52 **6** identified as anthophyllite could very well be
15:34:55 **7** cummingtonite, but you didn't make the distinction?
15:34:59 **8** MR. CIRSCH: Object to form.
15:34:59 **9** Q. (By Mr. Chachkes) Putting aside whether
15:35:01 **10** it matters or not.
15:35:02 **11** MR. CIRSCH: Object to form.
15:35:03 **12** THE WITNESS: Well, most of these
15:35:06 **13** elongated particles, these asbestiform bundles,
15:35:10 **14** could be anthophyllite --
15:35:11 **15** Q. (By Mr. Chachkes) The ones --
15:35:12 **16** MR. CIRSCH: Hold on.
15:35:13 **17** THE WITNESS: -- versus cummingtonite.
15:35:15 **18** But it's a difference without any consequence.
15:35:18 **19** They're both regulated asbestos.
15:35:19 **20** Q. (By Mr. Chachkes) Right. Putting aside
15:35:21 **21** the difference, okay -- this is just a question that
15:35:25 **22** should be very simple -- most of the part -- except
15:35:28 **23** for the one you went back and verified whether it was
15:35:31 **24** orthorhombic, most of the particles you identify in
15:35:34 **25** your report could either be -- that you identify as
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15:35:37 **1** anthophyllite could either be anthophyllite or
15:35:39 **2** cummingtonite, putting aside whether it even matters;
15:35:42 **3** is that a correct statement?
15:35:43 **4** MR. CIRSCH: Object to form.
15:35:44 **5** THE WITNESS: No. You don't know if most
15:35:46 **6** of the particles could. It could be this, it
15:35:48 **7** could be that. It could be mostly all
15:35:50 **8** anthophyllite.
15:35:52 **9** You know, you think it's all
15:35:54 **10** cummingtonite. But you're right, it doesn't
15:35:55 **11** matter because I identified them as the
15:36:01 **12** anthophyllite solid solution series.
15:36:02 **13** Q. (By Mr. Chachkes) Okay. Is there
15:36:03 **14** literature calling cummingtonite part of the
15:36:05 **15** anthophyllite solid solution series?
15:36:05 **16** A. **Lots of it.**
15:36:05 **17** Q. Okay. Can you cite one for me? Let's
15:36:10 **18** start with this. Any cited in your report?
15:36:11 **19** A. **Yes.**
15:36:12 **20** Q. Okay. Can you --
15:36:14 **21** A. **Can I show it to you?**
15:36:16 **22** Q. Yes, show it to me.
15:36:18 **23** A. **And I produced it in other J&J.**
15:36:37 **24** **It's easier for me just to look through**
15:36:41 **25 the references and find it for you.**
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15:36:43 **1** Q. That's okay. That's fine. We'll just
15:36:44 **2** leave it as is.
15:36:45 **3** A. **I believe it's -- let me just make sure**
15:36:46 **4 it's in here.**
15:36:55 **5** **It's reference 23, Manual of Mineralogy,**
15:36:58 **6 21st Edition, Revised, Cornelis Klein and**
15:37:04 **7 Cornelius S. Hurlbut, Jr., from John Wiley & Sons,**
15:37:07 **8 and it's on page about 256, if I remember correctly.**
15:37:11 **9** Q. Okay. What other mono -- okay.
15:37:15 **10** If your EDS doesn't tell you whether -- if
15:37:19 **11** you haven't determined whether what you're looking at
15:37:21 **12** is orthorhombic or monoclinic, are there any other
15:37:24 **13** minerals that they could be that are indeed also
15:37:28 **14** monoclinic?
15:37:29 **15** A. **No. Not after we do the full suite of**
15:37:31 **16 analyses. It's one of these regulated asbestos types**
15:37:34 **17 for the anthophyllite solid solution series.**
15:37:37 **18** Q. Okay.
15:37:37 **19** A. **These have been identified to the degree**
15:37:42 **20 necessary to make that statement.**
15:37:43 **21** Q. Okay. Just -- and we're going to ask a
15:37:45 **22** question in a vacuum, and I understand all your
15:37:48 **23** objections to answering questions about science in a
15:37:50 **24** vacuum, but it's important to us.
15:37:53 **25** If you have an SAED pattern where you
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15:37:56 **1** didn't determine whether it's orthorhombic or not,
15:38:00 **2** just looking at that pattern, in a vacuum, without
15:38:03 **3** your other information, is it possible -- can you
15:38:08 **4** exclude -- is it possible that correlates to any
15:38:12 **5** other monoclinic minerals?
15:38:14 **6** MR. CIRSCH: Object to form.
15:38:15 **7** THE WITNESS: I've already answered this
15:38:16 **8** question.
15:38:16 **9** We don't look at it in a vacuum. You're
15:38:18 **10** asking me to look at things in a vacuum that are
15:38:21 **11** not part of the peer-reviewed published
15:38:25 **12** identification protocols for asbestos.
15:38:27 **13** That's what we do. We look at and follow
15:38:29 **14** the procedures that are in the protocols. So
15:38:33 **15** when we do this analysis, especially for
15:38:36 **16** anthophyllite, we're looking at morphology,
15:38:38 **17** we're looking at chemistry, and we're looking at
15:38:40 **18** selected area electron diffraction.
15:38:43 **19** Q. (By Mr. Chachkes) So --
15:38:43 **20** MR. CIRSCH: Hold on.
15:38:44 **21** THE WITNESS: And that's my answer.
15:38:45 **22** Q. (By Mr. Chachkes) So you understand I'm
15:38:46 **23** allowed to ask questions that aren't specifically
15:38:49 **24** correlating to something in a regulation; right? I
15:38:51 **25** can ask about general science. You understand that;
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15:38:53 **1** right?

15:38:54 **2** MR. CIRSCH: Object to form. He can give

15:38:56 **3** you an answer --

4 Q. (By Mr. Chachkes) Yes or no?

15:38:57 **5** MR. CIRSCH: -- he thinks is appropriate.

15:38:59 **6** Q. (By Mr. Chachkes) It's a yes or no

15:39:01 **7** question.

15:39:01 **8** A. **Well, yes, you can ask any question you**

15:39:04 **9 want. But, no, I don't think it's appropriate to ask**

15:39:07 **10 questions that is not part of how we identify and ask**

15:39:12 **11 in a vacuum. So my answer stands.**

15:39:13 **12** Q. Okay. So I'll ask you again, and if you

15:39:14 **13** don't want to answer, you can give me the same

15:39:16 **14** circular answer, but I'm going to ask you again.

15:39:19 **15** MR. CIRSCH: Object to the commentary on

15:39:21 **16** the record, Alex. There's a lot of it.

15:39:23 **17** Q. (By Mr. Chachkes) If the -- looking at --

15:39:26 **18** if you haven't determined whether something is

15:39:29 **19** orthorhombic or not, looking at the SAED pattern in a

15:39:36 **20** vacuum, could it correspond to other minerals besides

15:39:40 **21** cummingtonite and anthophyllite?

15:39:43 **22** MR. CIRSCH: Object to form.

15:39:45 **23** THE WITNESS: That's not how we have done

15:39:46 **24** this analysis for every one of these samples

15:39:49 **25** that we're dealing with in TEM, for the 100,
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15:39:52 **1** almost 200 fibers and bundles that we've

15:39:55 **2** identified. We have used the peer-reviewed

15:39:59 **3** standard published protocol specifically to

15:40:02 **4** identify regulated asbestos. We didn't look at

15:40:05 **5** anything in a vacuum. We don't do that.

15:40:07 **6** Q. (By Mr. Chachkes) Okay. Putting that

15:40:09 **7** aside, this is just a matter of EDSA science. EDSA

15:40:14 **8** science tells me that Exhibit 18 looked at in

15:40:19 **9** isolation could correspond to many minerals; right?

15:40:25 **10** MS. O'DELL: Objection.

15:40:25 **11** Q. (By Mr. Chachkes) Just EDSA science?

15:40:28 **12** A. **Again, we're not dealing with many**

15:40:30 **13 minerals. We're dealing with regulated asbestos in a**

15:40:33 **14 talc deposit that has the ability to form these**

15:40:37 **15 billions of years ago under temperature and pressure.**

15:40:40 **16 We're using protocols that are specifically designed**

15:40:42 **17 to identify regulated asbestos. And that's what we**

15:40:45 **18 do.**

19 Q. Okay.

15:40:47 **20** A. **Asking things in a vacuum or hypotheticals**

15:40:49 **21 is not what we did.**

15:40:51 **22** MR. CHACHKES: Okay. How much time do we

15:40:55 **23** have left on the tape?

15:40:59 **24** THE VIDEOGRAPHER: 17.

15:41:00 **25** MR. CHACHKES: Why don't we just swap out
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15:41:02 **1** the tape and we don't have to take a break.

15:41:13 **2** (Recess from 3:41 p.m. to 4:01 p.m.)

16:02:00 **3** Q. (By Mr. Chachkes) Dr. Longo, the court

16:03:00 **4** reporter informed me that a couple of times I

16:03:01 **5** mispronounced EDXA as EDSA. Did you understand when

16:03:08 **6** I said EDSA to mean EDXA?

16:03:09 **7** A. **Yes. Energy dispersive spectroscopy**

16:03:12 **8 analysis is also well known.**

9 Q. Okay.

16:03:14 **10** A. **People have different acronyms for it, so**

16:03:18 **11 it's fine. I think I was repeating what you were**

16:03:20 **12 saying.**

16:03:20 **13** Q. Okay. So is it your position that

16:03:24 **14** reporting analytical sensitivity by weight percent

16:03:27 **15** does not provide any useful information for

16:03:30 **16** determining potential airborne exposure to asbestos

16:03:32 **17** structures?

16:03:32 **18** A. **Yes.**

16:03:33 **19** Q. Is it your position that structures per

16:03:37 **20** gram data is the most useful for potential airborne

16:03:40 **21** exposure?

16:03:40 **22** A. **Yes.**

16:03:41 **23** Q. And in your report, in support of that

16:03:44 **24** proposition, you cite ISO 10312; correct?

16:03:50 **25** A. **Correct. And it's in both of the ISO**
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16:03:51 **1 methods.**

16:03:51 **2** Q. Okay. ISO 10312 is a method for detecting

16:03:57 **3** asbestos in ambient air; correct?

16:03:58 **4** A. **Correct.**

16:03:59 **5** Q. Have you ever conducted air testing

16:04:02 **6** pursuant to the ISO 10312 method?

16:04:08 **7** A. **In the past, yes.**

16:04:10 **8** Q. Okay. How many times?

16:04:14 **9** A. **I don't know.**

16:04:15 **10** Q. Over ten?

16:04:16 **11** A. **I don't know.**

16:04:16 **12** Q. Over one?

16:04:18 **13** A. **Most likely over one, but how big the**

16:04:23 **14 bread box is, I don't know.**

16:04:25 **15** Q. Okay. Did you test anything under the

16:04:30 **16** ISO 10312 method for this case, the MDL?

16:04:36 **17** A. **Well, if you look at our report, we have**

16:04:38 **18 referenced a number of TEM methods for the counting**

16:04:40 **19 rules, including the two ISO methods, the ASTM**

16:04:46 **20 method, the AHERA method. They all have the same**

16:04:48 **21 counting rules for the determination of a regulated**

16:04:51 **22 asbestos fiber. The ISO methods are referred back to**

16:04:56 **23 in both the 22262-1 and -2 as the counting criteria**

16:05:01 **24 for fibers and bundles.**

16:05:03 **25** Q. Did you do an ISO 10312 ambient air test
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16:05:07 **1** for the purposes of this MDL?

16:05:09 **2 A. No.**

16:05:09 **3 Q.** And this ISO method involves collecting

16:05:14 **4** air samples and testing for fibers; correct?

16:05:17 **5 A. Correct.**

16:05:17 **6 Q.** And you're not testing ambient air fibers

16:05:19 **7** in this case, in this expert report?

16:05:22 **8 A. No, we're not testing ambient air. But**

16:05:25 **9 you have to understand once the asbestos gets on the**

16:05:27 **10 filter, the -- and I know it sounds silly, but the**

16:05:32 **11 asbestos fibers don't know if it came out of ambient**

16:05:34 **12 air, if it came out of a water sample, came out of a**

16:05:37 **13 dust sample, or it came out of a bulk sample like**

16:05:40 **14 cosmetic talc. What's most important is the counting**

16:05:43 **15 rules that are the same for all these different**

16:05:47 **16 methods, as in the ISO 22262-2 for the TEM analysis**

16:05:52 **17 of talc.**

16:05:53 **18 Q.** You did not conduct an exposure assessment

16:05:55 **19** for this case, did you?

16:05:56 **20 A. I haven't conducted an exposure assessment**

16:06:01 **21 with any MDL samples.**

16:06:04 **22 Q.** You did employ ISO 22262; correct?

16:06:08 **23 A. Yes.**

16:06:08 **24 Q.** That does not include a formula for

16:06:12 **25** reporting of data as structures per gram; correct?

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16:06:15 **1 A. That's correct.**

16:06:15 **2 Q.** The --

16:06:18 **3 A. Well, that's not quite true. If you go to**

16:06:20 **4 the ISO TEM method that it references, it shows you**

16:06:25 **5 how to report it in fibers or bundles per gram. So**

16:06:30 **6 again, you have to look at the methodology that it**

16:06:33 **7 references.**

16:06:34 **8 Q.** Okay. So let me -- which ISO, 1, 2, 3 --

16:06:39 **9** can you tell me -- are you referring to?

16:06:40 **10 A. It's the 137 --**

16:06:43 **11 Q.** ISO -- so it's part 1; correct?

16:06:47 **12 A. Well, it's in both. It's in part 1 and**

16:06:50 **13 part 2.**

16:06:50 **14 Q.** Okay. So can you point to me in part 2

16:06:54 **15** where -- and that's Exhibit 3 -- where it says --

16:06:57 **16** that proper reporting is done in structures per gram?

16:07:02 **17 A. Did you mark that as an exhibit?**

16:07:08 **18 Q.** Exhibit 3, yeah. It's going to be down

16:07:11 **19** from the beginning.

16:07:13 **20 A. It's 1. Give me a second. I will in a**

16:07:27 **21 second. I'm sure it's in this pile.**

16:07:27 **22** MR. CIRSCH: It might be there.

16:07:36 **23** THE WITNESS: There it is.

16:07:40 **24 Q.** (By Mr. Chachkes) It should be Exhibit 3.

16:07:41 **25** Okay.

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16:07:44 **1 A. So if you go to 16 --**

16:07:51 **2** MR. CIRSCH: You're calling it Exhibit 3,

16:07:53 **3** but it says on here Exhibit 5. I just want to

16:07:56 **4** make sure that --

16:07:57 **5** MR. CHACHKES: So Exhibit 3 should be

16:08:01 **6** ISO-2?

16:08:02 **7** MR. CIRSCH: It's got Exhibit 5 on it.

16:08:03 **8 Q.** (By Mr. Chachkes) I'm sorry, I'm reading

16:08:05 **9** my number wrong -- strike that. My 3 looked like --

16:08:09 **10** totally my fault.

16:08:10 **11** All right. Before you is Exhibit 5, which

16:08:14 **12** is part 2 of the ISO 22262 standard. Can you point

16:08:17 **13** to me where it requires reporting in structures per

16:08:22 **14** gram?

16:08:24 **15 A. If you go to 16.3, last paragraph before**

16:08:33 **16 you get to 17, it says, If it is required to include**

16:08:37 **17 all fiber sizes in the measurement, determination of**

16:08:40 **18 mass fraction by TEM using 14.2.4 is the optimum**

16:08:46 **19 analytical procedure.**

16:08:47 **20 If you go to 14.2.4 -- 14.2.4.4,**

16:09:12 **21 Preparation of specimens for SEM or TEM observation,**

16:09:17 **22 then it references back to the ISO 13794.**

16:09:22 **23 Q.** Okay. So you -- it's your understanding

16:09:25 **24** that the ISO 22262 -- so first of all, the ISO 22262

16:09:31 **25** -2, putting aside cross-references, itself doesn't

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16:09:36 **1** have a formula for reporting data as structures per

16:09:39 **2** gram; correct?

16:09:40 **3 A. That is correct.**

16:09:40 **4 Q.** Okay.

16:09:41 **5 A. And it doesn't have the formula for**

16:09:43 **6 calculating weight percent. It points you back to**

16:09:48 **7 the ISO TEM protocols.**

16:09:51 **8 Q.** Okay. And then the reference to 14.2.4,

16:09:55 **9** that section is entitled, Determination of asbestos

16:10:00 **10** weight mass fraction from fiber measurement made by

16:10:03 **11** PLM, SEM, or TEM.

16:10:04 **12** That's the title; right?

16:10:06 **13 A. Correct.**

16:10:06 **14 Q.** Okay. I just want to do a little walk

16:10:11 **15** through one of the calculations you made so I can

16:10:13 **16** figure it out.

16:10:14 **17** Can I have the exhibits? Mark this as

16:10:17 **18** Exhibit 19.

16:10:17 **19** (Defendants' Exhibit 19 was marked for

16:10:17 **20** identification.)

16:10:48 **21 Q.** (By Mr. Chachkes) Okay. Can you tell me

16:10:51 **22** just on a high level what this spreadsheet,

16:10:52 **23** Exhibit 19, is meant to represent?

16:10:53 **24 A. This represents the weight of the sample**

16:10:54 **25 that was used, it represents the weight of the sample**

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16:10:59 **1 analyzed per grid opening, it tells you what the**
 16:11:04 **2 filter size was, it tells you how many regulated**
 16:11:06 **3 asbestos structures, and then it gives you the**
 16:11:08 **4 calculation of how many asbestos structures per gram,**
 16:11:15 **5 which if you're doing weight percent, you have to do**
 16:11:18 **6 all the same -- get all the same information, but**
 16:11:22 **7 instead of stopping at the number of structures per**
 16:11:26 **8 gram, then you go through the calculation to**
 16:11:29 **9 determine the weight of each of the structures and**
 16:11:33 **10 then calculate a mass weight percent.**
 16:11:35 **11 Q. Okay. So in Exhibit 19, I guess, on the**
 16:11:40 **12 upper left I see a .03135. That's the initial weight**
 16:11:46 **13 prior to concentration method, or is that after**
 16:11:51 **14 concentration?**
 16:11:52 **15 A. That is the weight prior to the**
 16:11:54 **16 concentration method.**
 16:11:55 **17 Q. Okay. So that's basically the**
 16:12:00 **18 unconcentrated weight that you are trying to**
 16:12:02 **19 determine how many structures are in there?**
 16:12:05 **20 A. Correct.**
 16:12:07 **21 Q. And you use a Sartorius scale; right?**
 16:12:14 **22 A. That's correct.**
 16:12:14 **23 Q. Does it have that many significant digits?**
 16:12:16 **24 A. It does.**
 16:12:17 **25 Q. Okay. Does it have more than that, or is**
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16:12:19 **1 that it?**
 16:12:20 **2 A. Let's see. One, two, three, four, five.**
 16:12:24 **3 I think it has six.**
 16:12:26 **4 Q. Okay. But you only report five**
 16:12:29 **5 significant digits; correct?**
 16:12:31 **6 A. Correct.**
 16:12:31 **7 Q. And then your analysts conduct heavy**
 16:12:38 **8 liquid density separation; right?**
 16:12:40 **9 A. Correct.**
 16:12:40 **10 Q. After separation you have basically an**
 16:12:42 **11 amphibole sludge and with much of the talc removed?**
 16:12:48 **12 A. Correct.**
 16:12:48 **13 Q. And what is the percentage of talc from**
 16:12:53 **14 amphibole separation your analysts achieve in this**
 16:12:56 **15 analysis?**
 16:12:57 **16 A. We haven't measured that.**
 16:12:58 **17 Q. Do you have the data and just didn't put**
 16:13:04 **18 it on the sheet, or you just -- you don't even have**
 16:13:05 **19 the data?**
 16:13:05 **20 A. We don't measure the amount that we**
 16:13:07 **21 removed.**
 16:13:08 **22 Q. Okay. Is there a way to calculate it?**
 16:13:12 **23 MR. CIRSCH: Object to form.**
 16:13:13 **24 THE WITNESS: Not without making the**
 16:13:15 **25 measurement, no.**
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16:13:15 **1 Q. (By Mr. Chachkes) If you're analyzing two**
 16:13:17 **2 samples and sample A contains more amphiboles than**
 16:13:21 **3 sample B, would you expect that following the**
 16:13:25 **4 concentration there would be more products separated**
 16:13:27 **5 out from A than B?**
 16:13:29 **6 A. I don't know if you can measure that. If**
 16:13:32 **7 it contains more amphibole fibers in the final**
 16:13:37 **8 supernate, then you would have more fibers that you**
 16:13:41 **9 counted.**
 16:13:42 **10 Q. And by supernate, that's kind of a synonym**
 16:13:47 **11 for amphibole sludge --**
 16:13:49 **12 A. Well, it's the pellet. Whatever has gone**
 16:13:52 **13 down to the bottom of the centrifuge tube, any**
 16:13:56 **14 potential amphiboles, some talc particles, you always**
 16:14:00 **15 see talc particles, so it's not 100 percent**
 16:14:03 **16 efficient.**
 16:14:03 **17 Q. The supernate's the solids that are left**
 16:14:06 **18 over after the concentration?**
 16:14:07 **19 A. Correct.**
 16:14:08 **20 Q. So you can't say that if one sample has**
 16:14:10 **21 more amphiboles than another that there will be more**
 16:14:13 **22 supernate in the former than the latter?**
 16:14:17 **23 A. You would expect -- if it has more in**
 16:14:19 **24 there you would expect more, but it's pretty tough to**
 16:14:22 **25 make that determination before you measure it.**
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16:14:24 **1 Q. Yeah, I'm not asking you for a**
 16:14:26 **2 calculation. I'm just saying just seems like common**
 16:14:29 **3 sense if you've got more to concentrate out, you'll**
 16:14:33 **4 get more concentrate.**
 16:14:34 **5 MR. CIRSCH: Object to form.**
 16:14:35 **6 THE WITNESS: All things being equal,**
 16:14:37 **7 that's correct.**
 16:14:38 **8 Q. (By Mr. Chachkes) Okay. After separation**
 16:14:38 **9 you did not weigh the centrifuge that remained -- you**
 16:14:42 **10 did not weigh the supernate that remained after**
 16:14:48 **11 desiccation; correct?**
 16:14:49 **12 A. That's correct.**
 16:14:50 **13 Q. And I see a number, weight of sample**
 16:14:56 **14 analyzed; do you see that there?**
 16:14:58 **15 A. Correct.**
 16:14:58 **16 Q. That's more significant digits than in the**
 16:15:02 **17 initial weight; correct?**
 16:15:06 **18 A. That's correct. You take the amount that**
 16:15:07 **19 has theoretically gone down onto the filter, what you**
 16:15:12 **20 start with, so that if you have 31.35, then you**
 16:15:18 **21 calculate what's on the overall filter, and then you**
 16:15:20 **22 calculate how many grid openings you look at, then**
 16:15:23 **23 it's just the math.**
 16:15:24 **24 Q. Yeah, now my question is just about**
 16:15:25 **25 significant digits. You understand why significant**
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16:15:28 **1** digits are important; right?

16:15:29 **2 A. Yeah, but that's a mathematical**

16:15:33 **3 determination of significant digits.**

16:15:34 **4 Q.** Right. Significant digits are important

16:15:37 **5** because if I have a number with three significant

16:15:40 **6** digits multiplied times a number with four

16:15:45 **7** significant digits, the result should be reflecting

16:15:51 **8** the least number of significant digits that went into

16:15:53 **9** the equation; correct?

16:15:55 **10** MR. CIRSCH: Object to form.

16:15:56 **11** THE WITNESS: You can do it that way if

16:15:57 **12** you like, or you can put it out to the

16:15:59 **13** significant digits and then round it.

16:16:01 **14 Q.** (By Mr. Chachkes) Okay. Shouldn't you

16:16:04 **15** have rounded the weight of the sample analyzed

16:16:06 **16** because you've got more significant digits -- you've

16:16:08 **17** got more digits than there are significant digits?

16:16:10 **18 A. No. It's a mathematical -- it's a**

16:16:13 **19 mathematical equation or just simply dividing it on**

16:16:18 **20 how much of the original sample would cover the**

16:16:21 **21 filter.**

16:16:22 **22 Q.** Okay. You've got a -- I'm going to phrase

16:16:25 **23** this a different way.

16:16:26 **24** You've got a greater precision in your

16:16:29 **25** weight of sample analyzed than you do with the
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16:16:31 **1** precision of the numbers that went into it?

16:16:35 **2** MR. CIRSCH: Object to form.

16:16:36 **3** THE WITNESS: I don't think it's any more

16:16:38 **4** precision. It's taking the weight and dividing

16:16:40 **5** it onto the filter, and then from the filter

16:16:43 **6** you're looking at a number of area by 100 grid

16:16:45 **7** openings, so you're calculating what the weight

16:16:48 **8** would be if you put the whole -- to go back to

16:16:52 **9** the sample to determine the amount of fibers.

16:16:55 **10** That's just the way it's done.

16:16:56 **11 Q.** (By Mr. Chachkes) Does your Sartorius

16:16:59 **12** scale have the capability of measuring a sample down

16:17:01 **13** to .00017187 grams?

16:17:05 **14 A. Not the Sartorius, but we do have a**

16:17:08 **15 microbalance, but that's not how this is done.**

16:17:11 **16 Q.** So the -- this is just a yes or no. The

16:17:18 **17** weight of sample analyzed is a number that is a

16:17:24 **18** calculation; right?

16:17:26 **19** MR. CIRSCH: Object to form.

16:17:26 **20** THE WITNESS: Yes.

16:17:28 **21 Q.** (By Mr. Chachkes) Okay. And the

16:17:29 **22** structures per gram of sample, that's also a number

16:17:31 **23** that's calculated; right?

16:17:34 **24 A. That's correct.**

16:17:34 **25 Q.** And what's the equation to get me the
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16:17:42 **1** weight of sample analyzed?

16:17:44 **2 A. Well, you go back to the individual**

16:17:46 **3 structures and you multiply the length by the width**

16:17:52 **4 squared times the density of the particular type of**

16:17:56 **5 amphibole times pi. And then all those are added up,**

16:17:59 **6 and then you then go from the adding that up to what**

16:18:03 **7 the overall weight would be on the filter.**

16:18:05 **8 Q.** Okay. And the weight of sample analyzed

16:18:10 **9** is for one grid opening, ten grid openings, 100 grid

16:18:16 **10** openings? What is it?

16:18:17 **11 A. That's, as I believe, that's one grid**

16:18:19 **12 opening.**

16:18:19 **13 Q.** Okay. So if you wanted to extrapolate,

16:18:25 **14** putting aside --

16:18:26 **15 A. I may be wrong on that. I have to check**

16:18:29 **16 that. I think it's all 100.**

16:18:30 **17 Q.** Okay, if that's all 100. Now, that's what

16:18:37 **18** percentage of the total supernate?

16:18:38 **19 A. We haven't measured the total supernate.**

16:18:41 **20 We measure what we start with because the**

16:18:43 **21 calculations go back to what you start with. We**

16:18:46 **22 don't measure the supernate.**

16:18:48 **23 Q.** What percentage of what you started with

16:18:50 **24** is it?

16:18:51 **25 A. We started with 31 milligrams, and that is**
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16:19:03 **1 0.17. Well, we started with 0.3135 grams, and that**

16:19:10 **2 is .00017187 grams. So just divide the two.**

16:19:15 **3 Q.** So is there any need to extrapolate here,

16:19:22 **4** or is 100 percent of the supernate being looked at?

16:19:26 **5 A. You're putting 100 percent of the**

16:19:31 **6 supernate down onto the filter.**

16:19:32 **7 Q.** And that's 100 grid openings?

16:19:34 **8 A. Well, the filter is 201 millimeters**

16:19:38 **9 squared. That's the filter where the material is put**

16:19:41 **10 through the filter to collect it.**

16:19:43 **11 And then you're looking at 100 grid**

16:19:45 **12 openings. So 100 grid openings is 1.1 millimeter.**

16:19:50 **13 So 1.1 millimeter of the 201 millimeters will now**

16:19:54 **14 give you the percentage of what you're looking at on**

16:19:56 **15 that filter.**

16:19:57 **16 Q.** Why are you calculating that percentage?

16:20:02 **17** Isn't 100 percent of what comes through the filter in

16:20:05 **18** the grid openings -- in the 100 grid openings?

16:20:07 **19** MR. CIRSCH: Object to form.

16:20:08 **20** THE WITNESS: No.

16:20:08 **21 Q.** (By Mr. Chachkes) Okay.

16:20:09 **22 A. Can I draw on something?**

16:20:11 **23 Q.** Yeah.

16:20:13 **24 A. The filter is much bigger than 100 grid**

16:20:15 **25 openings.**
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16:20:16 **1** Q. Let me just -- here --

16:20:18 **2** MR. CIRSCH: Here you go.

16:20:22 **3** MR. CHACHKES: That would be great. Thank

16:20:22 **4** you.

16:20:22 **5** THE WITNESS: So if you have a filter

16:20:23 **6** that's this big -- that's not bad -- and then

16:20:27 **7** your grids are 3 millimeters. So -- shall I

16:20:34 **8** make a happy face here?

16:20:36 **9** Q. (By Mr. Chachkes) Please don't.

16:20:37 **10** A. **So each one of these grid openings -- and**

16:20:46 **11 I'm blowing it up.**

16:20:50 **12 So you're taking 7 millimeter plugs and**

16:20:53 **13 then each grid opening has 100 grids that are 100 by**

16:20:57 **14 100 microns, typically. So the material is going on**

16:21:01 **15 this whole filter, and then you're just taking**

16:21:04 **16 sections of the filter out for your TEM grids.**

16:21:07 **17** MR. CHACHKES: I see.

16:21:08 **18** So can we just mark this as an exhibit,

16:21:12 **19** Exhibit 20, please.

16:21:13 **20** (Defendants' Exhibit 20 was marked for

21 identification.)

16:21:19 **22** THE WITNESS: I didn't know you were going

16:21:21 **23** to mark it.

16:21:21 **24** Q. (By Mr. Chachkes) You did know I was

16:21:23 **25** going to mark it.

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1 A. **That's true.**

16:21:24 **2** Q. So what you've drawn in Exhibit 20 -- so I

16:21:26 **3** just want to get my vocabulary correct -- that the

16:21:31 **4** filter size is the big white circle in which you've

16:21:33 **5** got the three dots, that's the -- thank you for

16:21:35 **6** marking that.

16:21:35 **7** A. **Filter, which is 201 millimeters squared.**

16:21:41 **8** Q. Got it.

16:21:42 **9** A. **And that's the filtration area so you're**

16:21:46 **10 always -- because it's in a device that holds it,**

16:21:49 **11 it's not the whole size of the filter, but it's**

16:21:52 **12 actually the area where filtrate is going down**

16:21:55 **13 through it.**

16:21:56 **14** Q. Right. Okay.

16:21:56 **15** MR. CIRSCH: You're pulling those numbers

16:21:57 **16** from Exhibit 19; correct?

16:21:59 **17** THE WITNESS: Yes. It's the same size for

16:22:00 **18** every one.

16:22:01 **19** MR. CHACHKES: And if you would not

16:22:03 **20** comment.

16:22:04 **21** Q. (By Mr. Chachkes) And the black dots that

16:22:05 **22** you have there, those are the grid openings?

16:22:08 **23** A. **Those are the grids.**

16:22:09 **24** Q. Okay.

16:22:09 **25** A. **So a grid -- and this has been blown up --**

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16:22:17 **1** **is approximately 3 millimeters in diameter. Now, on**

16:22:23 **2 this grid are openings.**

3 Q. Okay.

16:22:24 **4** A. **And each one of these openings looks like**

16:22:35 **5 this, and they are 100 micrometers in width in two**

16:22:47 **6 directions. So when you look at a grid opening,**

16:22:49 **7 you're looking in this area.**

16:22:51 **8** Q. Okay. And I apologize for repeating it a

16:22:56 **9** little bit, but the -- just want to make sure the

16:22:59 **10** transcript's clear to correspond with the picture.

16:23:02 **11** You've got drawn, it looks like a circle

16:23:06 **12** with three black dots, that's the filter, and in the

16:23:09 **13** filter there are -- those black dots are grids;

16:23:12 **14** correct? So far correct?

16:23:13 **15** A. **So far correct.**

16:23:14 **16** Q. Okay. And how many grids -- I know your

16:23:17 **17** picture only has three, but how many grids are

16:23:20 **18** actually in your filter in the lab?

16:23:22 **19** A. **We make three grids.**

16:23:24 **20** Q. Oh, so there are three grids?

16:23:26 **21** A. **Correct.**

16:23:27 **22** Q. And then you've drawn a couple arrows to

16:23:29 **23** emphasize what the grid is, and the grid has got

16:23:32 **24** basically a bunch of grid openings and that's 100

16:23:34 **25** grid openings?

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16:23:35 **1** A. **Correct.**

16:23:36 **2** Q. Okay. And each grid opening is, you said,

16:23:39 **3** 10 micrometers?

16:23:40 **4** A. **100 micrometers.**

16:23:41 **5** Q. 100 micrometers. Got it.

16:23:43 **6** A. **100 micrometers, essentially a square, 100**

16:23:49 **7 micrometers for each XY dimension.**

16:23:51 **8** Q. Okay. And when you extrapolate filters --

16:23:59 **9** if the fibers you find in the filters back to the

16:24:03 **10** original weight of the sample, can you just walk me

16:24:06 **11** through that in conceptual terms?

16:24:08 **12** A. **In conceptual terms, you know the area**

16:24:12 **13 you've analyzed by the grid openings. You know the**

16:24:15 **14 area of your filter, and you take the -- you**

16:24:20 **15 determine the ratio of the amount of material on the**

16:24:25 **16 filter and then go to the amount of material that**

16:24:28 **17 would be on each grid opening, and then you take the**

16:24:32 **18 number of fibers you have and then you**

16:24:36 **19 back-calculate.**

16:24:36 **20** **So if I have three fibers in a known**

16:24:39 **21 amount, and that amount is some percentage of the**

16:24:43 **22 overall amount that I know that in the overall amount**

16:24:46 **23 on the filter, this is how many fibers and bundles**

16:24:52 **24 would be there because you have to assume a**

16:24:56 **25 homogenous distribution on the filter.**

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16:24:58 **1** Q. And do you look at the -- for your fiber
 16:25:05 **2** count, do you look at each of the three grids?
 16:25:08 **3** A. **We keep one for archive; we look at two**
 16:25:11 **4** **grids and 50 openings on each grid.**
 16:25:13 **5** Q. Okay. And why only 50 openings on each
 16:25:18 **6** grid?
 16:25:18 **7** A. **Well, typically the standard protocols,**
 16:25:23 **8** **the peer-reviewed protocols, usually state two grid**
 16:25:28 **9** **openings -- two grids, and so we put 50 on one and 50**
 16:25:33 **10** **on the other.**
 16:25:34 **11** Q. Why not 100 on one and 100 on the other?
 16:25:37 **12** A. **Well, that would take twice as much time.**
 16:25:40 **13** **And you could do that, or you could look at 300. It**
 16:25:45 **14** **doesn't change anything other than reduce your --**
 16:25:48 **15** **increase your analytical sensitivity.**
 16:25:50 **16** Q. Okay. Does the ISO 22262-2 lay out this
 16:26:00 **17** math for extrapolating from looking at a grid?
 16:26:05 **18** A. **No. It referenced the protocols. All TEM**
 16:26:11 **19** **analyses -- air sample, water sample, bulk sample --**
 16:26:15 **20** **is done in this manner. All analytical chemistry is**
 16:26:19 **21** **done in this manner.**
 16:26:20 **22** **If you take a gallon of water out of Lake**
 16:26:24 **23** **Michigan and you want to determine the amount of lead**
 16:26:26 **24** **in there, for example, hypothetical, you don't**
 16:26:28 **25** **measure the whole gallon, you measure, typically, a**
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16:26:32 **1** **couple of milliliters of the material and then you**
 16:26:34 **2** **extrapolate back on the overall concentration that**
 16:26:37 **3** **would be there.**
 16:26:38 **4** **The ISO TEM air sample method is the same**
 16:26:40 **5** **way. You're analyzing it and you find 4 or 5 fibers**
 16:26:46 **6** **in the grid opening, you're extrapolating back to**
 16:26:49 **7** **what is in the air samples.**
 16:26:51 **8** Q. Okay. Now, when you said the
 16:26:57 **9** peer-reviewed literature suggests looking at two of
 16:27:00 **10** the grids, can you give me an example of some such
 16:27:05 **11** literature?
 16:27:05 **12** A. **Well, there's lots of peer-reviewed**
 16:27:07 **13** **literature that used the standard protocols. If you**
 16:27:09 **14** **look at the AHERA, you look at ISO, you look at the**
 16:27:12 **15** **NIOSH 7402, you look at the PCM, anything that has to**
 16:27:18 **16** **do with TEM, you have two grid openings. The 7402**
 16:27:23 **17** **says 40 openings among two grids.**
 16:27:28 **18** **If you have a high number of fibers, then**
 16:27:31 **19** **you may stop on your second opening on one grid and**
 16:27:34 **20** **then go to the second grid. So the protocols**
 16:27:38 **21** **themselves state that.**
 16:27:39 **22** Q. Okay. Your analysts employed ISO 22262-2
 16:27:44 **23** to test for asbestos by TEM; is that correct?
 16:27:46 **24** A. **Yes.**
 16:27:47 **25** Q. And they use TEM to identify the particles
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16:27:55 **1** morphologically as asbestos; is that correct?
 16:27:58 **2** MR. CIRSCH: Object to form.
 16:27:59 **3** THE WITNESS: They use TEM to identify
 16:28:01 **4** regulated asbestos using morphology, EDXA and
 16:28:08 **5** SAED.
 16:28:09 **6** Q. (By Mr. Chachkes) Okay. So is there a
 16:28:10 **7** phrase that I can use that's not confusing to refer
 16:28:12 **8** to the visual aspect of TEM that's not, you know,
 16:28:16 **9** SAED or the other more different techniques?
 16:28:19 **10** A. **Well, if you say all the counting rules**
 16:28:21 **11** **for all the standard TEM methods that is not the**
 16:28:26 **12** **occupational exposure counting rules, they will all**
 16:28:30 **13** **state the same thing.**
 16:28:31 **14** Q. No, I'm just looking for a -- I want to
 16:28:33 **15** make sure we're speaking a common language, the
 16:28:36 **16** visual --
 16:28:37 **17** A. **How about just counting rules?**
 16:28:38 **18** Q. Well, we disagree as to what the counting
 16:28:40 **19** rules require.
 16:28:41 **20** So if I say the visual aspect of TEM as
 16:28:46 **21** opposed to the SAED and -- what do you call it when
 16:28:57 **22** you take a picture with the TEM?
 16:28:59 **23** MR. CIRSCH: Object to form.
 16:29:00 **24** THE WITNESS: Photomicrograph.
 16:29:01 **25** Q. (By Mr. Chachkes) Okay. So they use
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16:29:02 **1** photomicrographs to determine -- from the TEM to
 16:29:05 **2** determine morphology?
 16:29:06 **3** A. **No. They use the counting rules to**
 16:29:08 **4** **determine morphology, that it has parallel sides,**
 16:29:12 **5** **it's greater than .5 micrometers in length, it has at**
 16:29:15 **6** **least a 5-to-1 aspect ratio, and the chemistry in**
 16:29:20 **7** **SAED determines it to be a regulated asbestos, then**
 16:29:23 **8** **it's a regulated asbestos fiber.**
 16:29:25 **9** Q. I didn't ask what you look at to determine
 16:29:28 **10** whether it's asbestos or not.
 16:29:29 **11** What do you -- what physically are you
 16:29:33 **12** looking at to determine morphology? It's the
 16:29:35 **13** photomicrograph; right?
 16:29:37 **14** MR. CIRSCH: Object to form.
 16:29:37 **15** THE WITNESS: No. We're visually looking
 16:29:40 **16** through the microscope. And I'll use an
 16:29:42 **17** example. I'm looking at a magnification of
 16:29:46 **18** approximately 20,000 times, and in my field of
 16:29:49 **19** view a structure looking like this pen shows up.
 16:29:55 **20** The first thing I do is look at it and say
 16:29:57 **21** does it have parallel sides? The answer is yes.
 16:30:00 **22** We have calibration standards and go is it
 16:30:03 **23** greater than .5 micrometers in length? Yes.
 16:30:08 **24** Does it have an aspect ratio of greater than
 16:30:11 **25** 5-to-1? I can visually see that, but we take a
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16:30:14 **1** photomicrograph -- it's close -- to make sure.
 16:30:16 **2 Q.** (By Mr. Chachkes) So you use visual
 16:30:18 **3** inspection through the TEM to determine morphology?
 16:30:22 **4** MR. CIRSCH: Object to form.
 16:30:23 **5** THE WITNESS: With the counting rules,
 16:30:26 **6** that is correct.
 16:30:27 **7 Q.** (By Mr. Chachkes) Okay. Well, it doesn't
 16:30:29 **8** matter what the counting rules are. If you want to
 16:30:32 **9** look at -- if you want to just see the morphology,
 16:30:34 **10** you use visual inspection?
 16:30:36 **11** MR. CIRSCH: Object to form.
 16:30:36 **12** THE WITNESS: The first thing we do is
 16:30:38 **13** look at it and if it has parallel sides and does
 16:30:42 **14** it meet the counting rules where this is an
 16:30:47 **15** elongated particle, that deserves further
 16:30:51 **16** examination.
 16:30:51 **17 Q.** (By Mr. Chachkes) Can you tell me where
 16:30:53 **18** in ISO 22262 it provides -- directs you to look at
 16:31:01 **19** morphology under TEM?
 16:31:03 **20 A. I did. I gave you the ISO standard for**
 16:31:06 **21 TEM and indirect prep, and in order to determine what**
 16:31:11 **22 your weight percent is, you have to determine if it**
 16:31:14 **23 is parallel sides, greater than .5 micrometers in**
 16:31:17 **24 length, and so on and so forth.**
 16:31:19 **25 Not all methods replicate previous**
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 16:31:22 **1 methods. ISO 22262-2 does not put the entire**
 16:31:28 **2 counting protocol in there. It directs you to the**
 16:31:30 **3 TEM method where you have all these methodology to do**
 16:31:36 **4 that.**
 16:31:36 **5 Q.** Okay. So it's not, per se, in 22262, but
 16:31:40 **6** you're saying there's a reference to another ISO
 16:31:44 **7** standard which you say requires visual inspection
 16:31:49 **8** under TEM to determine morphology?
 16:31:52 **9** MR. CIRSCH: Object to form.
 16:31:53 **10** THE WITNESS: Well, per se it doesn't
 16:31:55 **11** replicate the entire procedure. That's how
 16:31:57 **12** these standards work.
 16:31:59 **13** Once it has a document, in this case,
 16:32:03 **14** another ISO document that lays out all the
 16:32:06 **15** procedures and practices for how to identify
 16:32:09 **16** regulated asbestos, it just goes back to that.
 16:32:13 **17 Q.** (By Mr. Chachkes) So --
 16:32:14 **18 A. ASTM is the same way, and the definition**
 16:32:17 **19 of asbestos fibers in ASTM has another document that**
 16:32:20 **20 tells you all the different definitions. One builds**
 16:32:25 **21 on the other.**
 16:32:26 **22 Q.** Okay. Just looking at 22262, there is a
 16:32:28 **23** section in there under part 1 that is labeled
 16:32:33 **24** Morphology; right?
 16:32:47 **25** Exhibit 4 is the one that's part 1?
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16:32:49 **1 A. Oh, part 1, I'm sorry.**
 16:32:51 **2 Q.** Yeah. I'll just direct your attention to
 16:33:05 **3** 7.2. -- on page 22.
 16:33:22 **4** So there's a section on page 22 which has
 16:33:26 **5** the heading Morphology; correct?
 16:33:28 **6 A. That is correct. 7.2.3.7.1. I'm**
 16:33:32 **7 surprised you didn't know that.**
 16:33:34 **8 Q.** I did, actually.
 16:33:36 **9** And the only heading, as far as you know,
 16:33:41 **10** in the ISO 22262 parts that actually says morphology
 16:33:47 **11** is this one? Or do you not know? I don't want to
 16:33:51 **12** spend all day on that one.
 16:33:52 **13** MR. CIRSCH: Form.
 16:33:53 **14** THE WITNESS: Well, this is a PLM
 16:33:54 **15** analysis. This is not TEM analysis. And ISO
 16:33:56 **16** has their PLM analysis setup, and these are the
 16:34:01 **17** counting rules of what you do when you're
 16:34:03 **18** analyzing under a polarized light microscope
 16:34:05 **19** versus a transmission electron microscope.
 16:34:07 **20 Q.** (By Mr. Chachkes) Did you use PLM to
 16:34:12 **21** identify the morphology of the fibers you found in
 16:34:15 **22** the MDL?
 16:34:16 **23** MR. CIRSCH: Object to form.
 16:34:19 **24** THE WITNESS: Well, that's worded -- and I
 16:34:20 **25** apologize. That's worded poorly.
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 16:34:22 **1** For our ISO 22262-1 PLM analysis, yes. We
 16:34:28 **2** went through, and each of these regulated
 16:34:32 **3** asbestos fibers that we have in there in
 16:34:34 **4** pictures follow this morphology.
 16:34:37 **5 Q.** (By Mr. Chachkes) Okay. In your reports
 16:34:43 **6** you write on page 12, Amphibole fibers or bundles
 16:34:49 **7** with substantially parallel sides and an aspect ratio
 16:34:53 **8** of 5-to-1 or greater and at least half a micrometer
 16:34:56 **9** in length were counted as regulated asbestos fibers
 16:35:00 **10** and bundles per the standard TEM counting rules
 16:35:03 **11** described by -- and then you cite six methods. Are
 16:35:07 **12** you with me so far?
 16:35:08 **13 A. I am.**
 16:35:08 **14 Q.** Which is the method you actually use?
 16:35:12 **15 A. Well, can't really point to any one method**
 16:35:15 **16 because they all have the same counting rules.**
 16:35:17 **17 Q.** Okay.
 16:35:27 **18 A. What page was that?**
 16:35:28 **19 Q.** I was just talking about page 12 of your
 16:35:31 **20** January 15.
 16:35:32 **21 A. I think it states that.**
 16:35:35 **22 This is for, again, TEM. And every one of**
 16:35:45 **23 those TEM methods have those counting rules, so I**
 16:35:48 **24 referenced them all.**
 16:35:50 **25** MR. CHACHKES: So I'm going to mark as the
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16:35:51 **1** next exhibit ISO 13794. We are on Exhibit 21.
 16:36:02 **2** (Defendants' Exhibit 21 was marked for
 16:36:25 **3** identification.)
 16:36:25 **4** **Q.** (By Mr. Chachkes) So we spoke a little
 16:36:26 **5** bit before about what's been marked as Exhibit 21;
 16:36:31 **6** right?
 16:36:31 **7** **A. Yes, sir, we have.**
 16:36:32 **8** **Q.** Okay. And going to the seventh page in
 16:36:41 **9** section 1, Scope. Section -- we're here.
 16:36:55 **10** **A. What page? ?? Did you say ??**
 16:36:59 **11** **Q.** Actually, strike that.
 16:37:00 **12** I'm sorry. So it was the seventh page of
 16:37:05 **13** the PDF, so let's strike that and start again.
 16:37:09 **14** Going to what's numbered in the exhibit as
 16:37:11 **15** page 1, going to the heading 1, this is Scope; right?
 16:37:17 **16** It's the scope of the ISO standard?
 16:37:19 **17** **A. Correct.**
 16:37:20 **18** **Q.** Okay. Subsection 1.1, which is substance
 16:37:24 **19** determined; do you see that?
 16:37:25 **20** **A. I do.**
 16:37:26 **21** **Q.** And then you see at the last sentence, The
 16:37:30 **22** method cannot discriminate between individual fibers
 16:37:33 **23** of asbestos and nonasbestos analogs of the same
 16:37:36 **24** amphibole mineral.
 16:37:36 **25** Do you see that?
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16:37:37 **1** **A. I do.**
 16:37:37 **2** **Q.** Do you agree with ISO 13794 that this
 16:37:43 **3** method cannot discriminate between individual fibers
 16:37:46 **4** of the asbestos and nonasbestos analogs of the same
 16:37:50 **5** amphibole material?
 16:37:50 **6** **A. Yes and no. If you're analyzing samples**
 16:37:56 **7** **over and over from the same source and you're seeing**
 16:38:01 **8** **both what people will clearly say is asbestiform**
 16:38:08 **9** **bundles and you have some individual fibers in there,**
 16:38:11 **10** **in my opinion you can discriminate against that.**
 16:38:12 **11** **If I was looking at one fiber and I didn't**
 16:38:15 **12** **have any information about it and hadn't analyzed**
 16:38:18 **13** **sample after sample, I would say that one fiber, it's**
 16:38:24 **14** **asbestos, it's asbestiform because it's formed like**
 16:38:28 **15** **asbestos, but, no, it does not meet the geological**
 16:38:31 **16** **definition for asbestos, high tensile strength,**
 16:38:36 **17** **flexible, and so on and so forth.**
 16:38:39 **18** **But to me, asbestiform means that it is**
 16:38:42 **19** **fibrous like asbestos; I would call it asbestiform.**
 16:38:45 **20** **Q.** So it's your understanding when -- in this
 16:38:49 **21** exhibit, in this ISO standard, when it says it can't
 16:38:52 **22** discriminate between asbestos and nonasbestos
 16:38:54 **23** analogs, it's referring to geological definitions and
 16:39:00 **24** not regulatory definitions; is that your testimony?
 16:39:02 **25** **MR. CIRSCH: Object to form.**
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16:39:03 **1** THE WITNESS: Well, it is regulatory. If
 16:39:05 **2** it -- even though it cannot discriminate, you
 16:39:07 **3** have to count it, and it is a regulated asbestos
 16:39:10 **4** fiber if you decide it's asbestiform or not. It
 16:39:14 **5** does not allow you to discriminate between the
 16:39:16 **6** two as long as it meets the counting rules. It
 16:39:18 **7** is regulated.
 16:39:19 **8** **Q.** (By Mr. Chachkes) Okay.
 16:39:19 **9** **A. Now, we can argue over back and forth if**
 16:39:21 **10** **it is asbestiform or not. But make no mistake, it is**
 16:39:24 **11** **a regulated asbestos fiber if it meets the counting**
 16:39:27 **12** **rules.**
 16:39:28 **13** **Q.** Okay. So you're saying that something can
 16:39:31 **14** meet the counting rules, be regulated, but it might
 16:39:34 **15** be the non -- you might be counting nonasbestos
 16:39:37 **16** analogs?
 16:39:38 **17** **MR. CIRSCH: Object to form.**
 16:39:39 **18** **THE WITNESS: It's not nonasbestos.**
 16:39:42 **19** **It's --**
 16:39:42 **20** **Q.** (By Mr. Chachkes) I'm using the phrase
 16:39:44 **21** in --
 16:39:44 **22** **A. It is not nonasbestos. If it meets all**
 16:39:46 **23** **the counting rules, it's a regulated asbestos fiber.**
 16:39:49 **24** **That's my position on that.**
 16:39:50 **25** **Q.** Okay. In this last sentence of 1.1, it
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16:39:55 **1** makes a distinction between asbestos and nonasbestos
 16:39:57 **2** analogs; do you see that?
 16:39:58 **3** **A. I see that.**
 16:39:59 **4** **Q.** That's black and white; right?
 16:40:00 **5** **MR. CIRSCH: Object.**
 16:40:01 **6** **THE WITNESS: That's what it states.**
 16:40:02 **7** **Q.** (By Mr. Chachkes) Okay. So tell me what
 16:40:04 **8** asbestos versus nonasbestos analogs mean in
 16:40:09 **9** ISO 13794.
 16:40:09 **10** **MR. CIRSCH: Object to form.**
 16:40:10 **11** **THE WITNESS: They don't really define it**
 16:40:12 **12** **other than to say it may not.**
 16:40:13 **13** **In my opinion, if it is fibrous,**
 16:40:16 **14** **asbestiform, fibrous like asbestos-form, it is**
 16:40:20 **15** **asbestiform.**
 16:40:21 **16** **Q.** (By Mr. Chachkes) Yeah, but what I want
 16:40:23 **17** is can you make any -- reading -- looking at that
 16:40:27 **18** sentence, there's a clear distinction between
 16:40:30 **19** asbestos and nonasbestos analogs. What's the
 16:40:32 **20** difference?
 16:40:33 **21** **It doesn't matter what you think. What is**
 16:40:34 **22** **the ISO -- what distinction are they making? Or you**
 16:40:37 **23** **just can't say?**
 16:40:38 **24** **MR. CIRSCH: Object to form.**
 16:40:38 **25** **THE WITNESS: It's not that they don't**
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16:40:40 **1** say. They don't tell you how to determine
 16:40:41 **2** between, quote, this nonasbestos -- this
 16:40:44 **3** nonasbestiform versus asbestiform. There is no
 16:40:50 **4** method for doing that.
 16:40:52 **5** **Q.** (By Mr. Chachkes) Okay. Is it your
 16:40:53 **6** opinion because they don't give a definition of the
 16:40:56 **7** distinction, they really didn't mean that
 16:40:59 **8** distinction?
 16:40:59 **9** **A. I can't say what the --**
 16:41:01 **10** MR. CIRSCH: Object to form.
 16:41:02 **11** THE WITNESS: -- what Eric Chatfield had
 16:41:05 **12** in mind when he said that.
 16:41:07 **13** **Q.** (By Mr. Chachkes) Okay.
 16:41:07 **14** **A. But in the protocol, what I look at as a**
 16:41:09 **15** **scientist, and we look at these protocols, what does**
 16:41:13 **16** **it say to make the determination between the two? It**
 16:41:17 **17** **doesn't give you any information. Same thing with**
 16:41:19 **18** **the whole asbestiform, high tensile strength,**
 16:41:23 **19** **et cetera.**
 16:41:24 **20** **But we have the ability now, we have**
 16:41:26 **21** **analyzed so many samples and have analyzed so many**
 16:41:30 **22** **regulated asbestos fibers and bundles that we have**
 16:41:34 **23** **enough information if that is really at issue that**
 16:41:37 **24** **these are all asbestiform.**
 16:41:40 **25** **But no matter if you want to argue that**

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16:41:42 **1** **it's not, it is, for single fibers, it's all**
 16:41:45 **2** **regulated asbestos fibers per these protocols.**
 16:41:47 **3** **Q.** Yeah, you've already said that a number of
 16:41:49 **4** times, and I'm not going to take issue with your
 16:41:51 **5** opinion in that regard.
 16:41:52 **6** What I want to know is the phrase
 16:41:56 **7** nonasbestos analog appears in ISO 13794. What does
 16:42:00 **8** it mean? And if you have no idea, that's fine.
 16:42:03 **9** MR. CIRSCH: Object to form.
 16:42:04 **10** THE WITNESS: It's not that I don't have
 16:42:05 **11** any idea. I have an opinion about it. And it's
 16:42:08 **12** not my opinion that they're regulated asbestos
 16:42:10 **13** or not and you count them. The protocol tells
 16:42:13 **14** you to count them, that this is a regulated
 16:42:16 **15** asbestos fiber, you will record it on a count
 16:42:19 **16** sheet. All these protocols do that.
 16:42:21 **17** It doesn't give you the information to
 16:42:22 **18** make the determination. Just like it doesn't
 16:42:24 **19** give you the information to determine if you
 16:42:26 **20** have high tensile strength. It does not give
 16:42:30 **21** you the information to make the determination
 16:42:31 **22** what a population is. It does not give you the
 16:42:34 **23** information to make a determination if it's
 16:42:37 **24** flexible or not.
 16:42:37 **25** **Q.** (By Mr. Chachkes) Putting aside what gets

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16:42:39 **1** counted and what doesn't get counted, what does
 16:42:41 **2** nonasbestos analogs in this sentence mean? What does
 16:42:45 **3** that phrase mean?
 16:42:46 **4** MR. CIRSCH: Object to form. And this is
 16:42:48 **5** the last time he's going to answer this
 16:42:51 **6** question.
 16:42:51 **7** THE WITNESS: I don't know what they're
 16:42:52 **8** saying what it means because they don't give you
 16:42:54 **9** any information to make that determination.
 16:42:56 **10** I look at just simply what does
 16:42:58 **11** asbestiform mean. It means formed like
 16:43:01 **12** asbestos.
 16:43:02 **13** So you may not like my opinion, but that's
 16:43:06 **14** my opinion.
 16:43:06 **15** **Q.** (By Mr. Chachkes) You know that under 2.6
 16:43:13 **16** on page 2 it says, Asbestiform is a specific type of
 16:43:17 **17** mineral fibrosity in which fibers and fibrils possess
 16:43:21 **18** high tensile strength and flexibility.
 16:43:24 **19** You see that; right?
 16:43:25 **20** **A. What is it? 2.6?**
 16:43:27 **21** **Q.** 2.6. Do you see that?
 16:43:27 **22** **A. Yes, I do.**
 16:43:27 **23** **Q.** Would it be reasonable to conclude
 16:43:29 **24** nonasbestiform is something that is an analog to
 16:43:33 **25** something that is asbestiform under 2.6?

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16:43:35 **1** **A. No.**
 16:43:35 **2** MR. CIRSCH: Object to form.
 16:43:36 **3** THE WITNESS: The protocol doesn't tell
 16:43:38 **4** you what any of that means. High tensile
 16:43:41 **5** strength. What tensile strength? How do you
 16:43:45 **6** measure that?
 16:43:46 **7** That's just a general geological
 16:43:48 **8** definition for somebody who may be interested in
 16:43:51 **9** digging asbestos out of the ground, and is it
 16:43:53 **10** going to be fibrous enough to be profitable?
 16:43:56 **11** That has no meaning in the protocol.
 16:43:57 **12** Otherwise, in a protocol for how to do the
 16:44:00 **13** analysis, how do you determine it's high tensile
 16:44:03 **14** strength? What does high tensile strength mean?
 16:44:06 **15** Is it 10,000 high, is it 2,000 high has no
 16:44:11 **16** bearing on the actual analysis in the protocol.
 16:44:11 **17** **Q.** (By Mr. Chachkes) Okay.
 16:44:13 **18** **A. This is nothing more than a standard**
 16:44:16 **19** **geological definition for a high fibrous mine of**
 16:44:20 **20** **asbestos.**
 16:44:20 **21** **Q.** In your opinion, is the sentence that this
 16:44:24 **22** method -- this ISO method can't discriminate between
 16:44:28 **23** individual fibers of asbestos and nonasbestiform
 16:44:31 **24** analogs, is it related to those definitions in 2.6,
 16:44:35 **25** 2.7?

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16:44:36 **1 A. No, because those definitions aren't**
 16:44:39 **2 defined anywhere in the protocol for the analysis.**
 16:44:42 **3 Q.** Okay. And so when ISO uses the word
 16:44:45 **4** asbestos on page 1, it's not related to how ISO
 16:44:49 **5** defines asbestos on page 2?
 16:44:52 **6** MR. CIRSCH: Object to form.
 16:44:53 **7** THE WITNESS: On page 2, if you go to
 16:45:02 **8** page 3, they define what a fiber is.
 16:45:08 **9** Is it page 3 or page 4? Give me a second.
 16:45:17 **10** ISO defines a fiber -- for the purpose of
 16:45:20 **11** this International Standard, a fiber is defined
 16:45:23 **12** to have an aspect ratio equal or greater than
 16:45:26 **13** 5-to-1 and a minimum length of 5.0.
 16:45:29 **14** Fiber bundle, structure composed of
 16:45:31 **15** parallel smaller diameter fibers attached to
 16:45:35 **16** longer lengths.
 16:45:36 **17** Fibrous structure.
 16:45:38 **18** And then you go to, okay, once I've
 16:45:40 **19** defined it as a fiber, in the method tells you
 16:45:43 **20** to -- how to identify it if it is asbestos fiber
 16:45:46 **21** or not.
 16:45:48 **22** Nothing else in there tells you anything
 16:45:49 **23** about how to determine tensile strength, how to
 16:45:52 **24** determine flexibility, how to determine the
 16:45:56 **25** pop -- this one doesn't say population, but some
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16:45:59 **1** do.
 16:45:59 **2 Q.** (By Mr. Chachkes) It's a simple -- very
 16:46:01 **3** simple question. Page 1, the word asbestos is used.
 16:46:04 **4** On page 2 I see a definition of asbestos. Is it your
 16:46:07 **5** testimony that the two are unrelated, or are they
 16:46:10 **6** related?
 16:46:11 **7** MR. CIRSCH: Object to form.
 16:46:11 **8 Q.** (By Mr. Chachkes) It's a yes or no. Are
 16:46:13 **9** they related?
 16:46:14 **10** MR. CIRSCH: Object to form.
 16:46:14 **11** THE WITNESS: This is not a yes and no
 16:46:16 **12** question. You have to take the whole protocol
 16:46:18 **13** into consideration to answer this question.
 16:46:21 **14** The whole protocol determines what is a
 16:46:24 **15** regulated asbestos, and then the asbestiform and
 16:46:27 **16** high tensile strength is just a general
 16:46:30 **17** definition. That's what it means.
 16:46:32 **18 Q.** (By Mr. Chachkes) Okay. So if I want to
 16:46:36 **19** figure out what nonasbestos analog means in 1.1, I
 16:46:41 **20** could not use definitions like 2.6, 2.7, 2.8 to help
 16:46:46 **21** me determine that?
 16:46:48 **22** MR. CIRSCH: Object to form.
 16:46:49 **23** THE WITNESS: Well, those definitions tell
 16:46:51 **24** you what is a regulated asbestos fiber. There
 16:46:55 **25** is nothing in the protocol that tells you how to
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16:46:58 **1** make the determination other than the counting
 16:47:00 **2** rules.
 16:47:01 **3** Certainly, if it doesn't have parallel
 16:47:04 **4** sides, if it is a piece of a chunk of rock,
 16:47:08 **5** yeah, that's nonasbestiform. But when it has
 16:47:10 **6** the definition and meets the regulatory fiber
 16:47:14 **7** definition for asbestos, it is asbestos.
 16:47:17 **8 Q.** (By Mr. Chachkes) Okay. But you agree
 16:47:19 **9** with the sentence in -- all right. Strike that.
 16:47:36 **10** You personally can distinguish between
 16:47:40 **11** asbestos and nonasbestos analogs with TEM; is that
 16:47:44 **12** correct?
 16:47:44 **13** MR. CIRSCH: Object to form.
 16:47:45 **14** THE WITNESS: Yes, I can.
 16:47:49 **15 Q.** (By Mr. Chachkes) Using the ISO 13794
 16:47:54 **16** method; correct?
 16:47:56 **17 A. Yes, I can. If it doesn't meet the**
 16:47:57 **18 counting rules, it doesn't have parallel sides, it**
 16:48:01 **19 doesn't have the aspect ratio, I don't record that as**
 16:48:05 **20 an asbestos -- as an asbestos -- regulated asbestos**
 16:48:09 **21 fiber.**
 16:48:11 **22 Outside those counting rules, there's**
 16:48:12 **23 nothing else in there. If it has parallel sides --**
 16:48:18 **24 and what we're arguing is a small number of fibers.**
 16:48:22 **25 I think in the MDL we had almost 90-something percent**
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16:48:25 **1 bundles.**
 16:48:25 **2 So then we're dealing with some single**
 16:48:29 **3 fibers. And because we have this -- and I'll call**
 16:48:34 **4 it -- since a population is more than one, for these**
 16:48:37 **5 two mine sources we're dealing with, we have a large**
 16:48:40 **6 number of asbestiform bundles and a much smaller**
 16:48:44 **7 number of individual fibers.**
 16:48:45 **8 Q.** Would you agree that there are two types
 16:48:47 **9** of tremolite --
 16:48:48 **10** MR. CIRSCH: Did you finish your answer,
 16:48:49 **11** Dr. Longo?
 16:48:49 **12** THE WITNESS: I think so.
 16:48:50 **13 Q.** (By Mr. Chachkes) Would you agree that
 16:48:51 **14** there's two kinds of tremolite: asbestiform and
 16:48:54 **15** nonasbestiform?
 16:48:55 **16 A. I agree there's tremolite asbestos; and**
 16:48:57 **17 then there's tremolite asbestos, regulated tremolite**
 16:49:01 **18 asbestos. Then there is what we don't count as a**
 16:49:04 **19 regulated asbestos fiber because of various reasons.**
 16:49:07 **20 Q.** Is there such a thing as nonasbestiform
 16:49:11 **21** tremolite?
 16:49:12 **22 A. There is cleavage fragment type small**
 16:49:16 **23 particulates of tremolite that we do not count. You**
 16:49:18 **24 can call it nonasbestiform; you can call it a**
 16:49:20 **25 cleavage fragment. But I would agree with that.**
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16:49:23 **1 Anything below 5-to-1 aspect ratio we don't count.**
 16:49:27 **2 And you can call it whatever you like, but it's not a**
 16:49:30 **3 regulated asbestos fiber/bundle.**
 16:49:32 **4 Q.** Okay. Do you ever -- do you feel like you
 16:49:39 **5** have the ability to talk about a mineralogical --
 16:49:42 **6** what you called a mineralogical definition of
 16:49:44 **7** asbestos? Or is that outside of your expertise?
 16:49:47 **8 A. You mean a geological definition?**
 16:49:49 **9 Q.** Or a geological.
 16:49:50 **10 A. Sure.**
 16:49:50 **11 Q.** Okay. Geologically, what's a
 16:49:52 **12** nonasbestiform asbestos?
 16:49:53 **13 A. Rocks.**
 16:49:56 **14 Q.** That's it? Everything that's rock is
 16:49:59 **15** nonasbestiform asbestos?
 16:50:01 **16** MR. CIRSCH: Object to form.
 16:50:02 **17** THE WITNESS: If it doesn't have a fibrous
 16:50:04 **18** habitat, it's nonasbestos.
 16:50:07 **19 Q.** (By Mr. Chachkes) Okay.
 16:50:08 **20 A. Or habit -- excuse me -- not habitat. I**
 16:50:10 **21 think that's where animals live. I apologize.**
 16:50:12 **22 Strike that.**
 16:50:12 **23 If the crystalline habit is not fibrous,**
 16:50:17 **24 then it's not something that is mined or used as a**
 16:50:22 **25 regulated -- and it's not determined to be a**
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 16:50:24 **1 regulated asbestos.**
 16:50:24 **2 Q.** All right. You remember the original
 16:50:26 **3** question was not about regulations; it was about the
 16:50:28 **4** geological definitions; right?
 16:50:31 **5** MR. CIRSCH: Object to form.
 16:50:32 **6** THE WITNESS: I believe I have enough
 16:50:33 **7** expertise to discuss the geological definitions,
 16:50:36 **8** to discuss this high tensile strength, to
 16:50:40 **9** discuss what the value of a mine is that has
 16:50:42 **10** very matted, very fibrous asbestos, like
 16:50:45 **11** chrysotile, versus what a ton of the same
 16:50:49 **12** asbestos where it's 7M and it's almost two
 16:50:54 **13** orders of magnitude difference. It's about the
 16:50:56 **14** viability of a particular asbestos mine.
 16:50:58 **15 Q.** (By Mr. Chachkes) Okay. Tremolite alone
 16:51:02 **16** does not mean it's asbestos; would you agree with
 16:51:04 **17** that statement --
 16:51:09 **18** MS. O'DELL: Object to form.
 16:51:11 **19 Q.** (By Mr. Chachkes) -- saying something's
 16:51:14 **20** tremolite?
 16:51:16 **21** MS. O'DELL: Object to form.
 16:51:18 **22** THE WITNESS: It depends on what you're
 16:51:20 **23** talking about. If you're talking about, say,
 16:51:22 **24** XRD 20, 30, 40 years ago, said tremolite in a
 16:51:24 **25** particular mine and over time that particular
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16:51:24 **1** mine has shown that the tremolite in there is
 16:51:27 **2** primarily asbestiform, then, yeah, you can take
 16:51:30 **3** all the data specifically and say, well, this
 16:51:34 **4** whole data with XRD shows that there was
 16:51:37 **5** tremolite present, but no, it doesn't -- XRD
 16:51:39 **6** does not give you fibrous. But after a while,
 16:51:43 **7** if you analyze enough samples out of the mine
 16:51:45 **8** and you're seeing regulated asbestos fibers and
 16:51:47 **9** bundles, then more likely than not those initial
 16:51:51 **10** XRD analysis was asbestos.
 16:51:53 **11 Q.** (By Mr. Chachkes) Without referring to
 16:51:55 **12** the -- so you understand that I can look at a tree in
 16:52:00 **13** many different ways. I can look at it through a
 16:52:02 **14** microscope, I can look at it through a telescope, I
 16:52:05 **15** can look at it with my own eyes. So far you're with
 16:52:08 **16** me?
 16:52:08 **17 A. So far.**
 16:52:09 **18 Q.** Okay. Do you understand that the way I
 16:52:10 **19** look at it doesn't change the definition of whether
 16:52:12 **20** it's a tree or not; right?
 16:52:14 **21** MR. CIRSCH: Object to form.
 16:52:15 **22 Q.** (By Mr. Chachkes) Is that true or not?
 16:52:16 **23** MR. CIRSCH: Object to form.
 16:52:17 **24 Q.** (By Mr. Chachkes) I'm only asking about
 16:52:20 **25** the tree now.
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 16:52:21 **1 A. I don't think you would be able to tell by**
 16:52:24 **2 a telescope. But if you're looking at a tree, it's a**
 16:52:27 **3 tree.**
 16:52:27 **4 Q.** Right. It doesn't matter how I'm looking
 16:52:29 **5** at it. A tree is a tree; is that correct?
 16:52:32 **6** MS. O'DELL: Object to form.
 16:52:33 **7** THE WITNESS: Your tree analogy for a
 16:52:36 **8** tree, that's correct.
 16:52:36 **9 Q.** (By Mr. Chachkes) Okay. So are you
 16:52:38 **10** saying it's different for asbestos? I call something
 16:52:41 **11** asbestos or nonasbestiform depending on how I look at
 16:52:44 **12** it?
 16:52:44 **13** MR. CIRSCH: Object to form.
 16:52:45 **14** THE WITNESS: No. It's sort of a
 16:52:46 **15** misleading kind of analogy.
 16:52:48 **16** What I'm talking about is back 50 years
 16:52:53 **17** ago, when you're looking at a tree, you said it
 16:52:56 **18** was a tree. Somebody asked later that -- people
 16:52:59 **19** went in who actually knew what trees were and
 16:53:02 **20** said, well, 95 percent of these are oak trees 40
 16:53:05 **21** years later. Then you go, well, what was I
 16:53:07 **22** actually looking at 50 years ago for these same
 16:53:10 **23** trees? Well, oak trees.
 16:53:11 **24 Q.** (By Mr. Chachkes) I'm just talking
 16:53:13 **25** about -- okay. Stick with me here. Don't talk about
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16:53:16 **1** history. Don't talk about the way I'm looking at
16:53:18 **2** things. Don't talk about regulations.
16:53:20 **3** Just strictly objectively, what is
16:53:24 **4** nonasbestiform versus asbestiform?
16:53:27 **5** MR. CIRSCH: Object to form.
16:53:28 **6** **Q.** (By Mr. Chachkes) And if you can do that
16:53:30 **7** without telling me -- without -- can you do that
16:53:33 **8** without talking about the device I'm looking at it
16:53:34 **9** with? Is that possible?
16:53:37 **10** MR. CIRSCH: Object to form.
16:53:38 **11** THE WITNESS: No --
16:53:40 **12** **Q.** (By Mr. Chachkes) Okay. What --
13 **A.** -- because --
16:53:43 **14** MR. CIRSCH: Let him answer.
16:53:43 **15** THE WITNESS: What we're doing here is
16:53:44 **16** we're using sophisticated devices to make the
16:53:49 **17** determination if these are regulated asbestos or
16:53:50 **18** not.
16:53:50 **19** I understand that maybe for whatever
16:53:52 **20** reason you want to just pick little pieces here
16:53:55 **21** and there, but this is not what we do with this
16:53:56 **22** analysis.
16:53:57 **23** We're using standard peer-reviewed
16:54:02 **24** published protocols for the determination of
16:54:05 **25** regulated asbestos fibers and bundles.
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16:54:08 **1** **Q.** (By Mr. Chachkes) Tremolite -- just
16:54:10 **2** saying something is tremolite does not mean it's
16:54:12 **3** asbestos in certain contexts; is that true?
16:54:15 **4** MS. O'DELL: Object to the form.
16:54:16 **5** THE WITNESS: Again, when we do these
16:54:18 **6** analyses, anything that doesn't meet the
16:54:20 **7** regulated asbestos counting rules we do not
16:54:23 **8** count. You can call it whatever you like, but
16:54:25 **9** it doesn't meet the counting rules.
16:54:27 **10** Everything that we have published and
16:54:29 **11** provided here is regulated asbestos fibers and
16:54:32 **12** bundles.
16:54:33 **13** **Q.** (By Mr. Chachkes) Okay. What is a
16:54:34 **14** cleavage fragment?
16:54:35 **15** **A.** **Cleavage fragment, typically for**
16:54:38 **16** **tremolite, is particulates that have an aspect ratio**
16:54:41 **17** **of somewhere between 1-to-1 to 1-to-2, but they will**
16:54:44 **18** **have the same chemistry and the same crystalline**
16:54:47 **19** **pattern.**
16:54:48 **20** **Q.** Do you agree with ISO 13794 when it
16:54:53 **21** defines cleavage fragment as a fragment of a crystal
16:54:57 **22** that is bounded by cleavage faces?
16:55:00 **23** **A.** **Yes.**
16:55:00 **24** **Q.** Would you agree with this statement:
16:55:03 **25** Crushing of nonasbestiform amphiboles can -- I'm
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16:55:09 **1** sorry. Strike that. Start again.
16:55:19 **2** Do you agree with this statement:
16:55:21 **3** Crushing of nonasbestiform amphibole can lead to
16:55:24 **4** elongate fragments that conform to the definition of
16:55:27 **5** a fiber?
16:55:30 **6** **A.** **I've not seen those with these counting**
16:55:35 **7** **rules. Certainly we have seen lots of these**
16:55:38 **8** **fragments that are below 5-to-1 aspect ratio.**
16:55:45 **9** **I'm not ruling it out, but we typically**
16:55:47 **10** **don't see that. When we did a size distribution**
16:55:51 **11** **of --**
16:55:52 **12** **Q.** I'm not talking about what you can't
16:55:54 **13** see --
16:55:55 **14** MR. CIRSCH: Hold on.
16:55:56 **15** THE WITNESS: Hold on, hold on.
16:55:57 **16** We don't typically see that but your
16:55:59 **17** hypothetical, if it does have parallel sides, if
16:56:02 **18** it does meet all the definitions of the counting
16:56:04 **19** rules, you can call it what you like, but it's
16:56:07 **20** regulated asbestos per the standard counting
16:56:10 **21** rules for every one of these TEM methods that I
16:56:13 **22** have referenced in my report.
16:56:15 **23** **Q.** (By Mr. Chachkes) I kind of lost track
16:56:17 **24** there.
16:56:17 **25** Do you agree with the statement: Crushing
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16:56:20 **1** of asbestiform amphibole can lead to elongate
16:56:23 **2** fragments that conform to the definition of a fiber?
16:56:26 **3** MR. CIRSCH: Object to form.
16:56:27 **4** THE WITNESS: I've not seen one, so maybe
16:56:29 **5** somebody else has.
16:56:30 **6** **Q.** (By Mr. Chachkes) Okay. Do you agree
16:56:32 **7** with the statement: Crushed nonasbestiform
16:56:34 **8** amphiboles rarely have aspect ratios exceeding
16:56:37 **9** 30-to-1?
16:56:38 **10** **A.** **I've not seen crushed -- I'm sorry, would**
16:56:42 **11** **you repeat that?**
16:56:43 **12** **Q.** Crushed nonasbestiform amphiboles rarely
16:56:46 **13** have aspect ratios exceeding 30-to-1.
16:56:49 **14** **A.** **I've rarely seen anything greater than**
16:56:53 **15** **1-to-1, 2-to-1, 3-to-1.**
16:57:00 **16** **Q.** The question is do you agree with that
16:57:02 **17** statement, yes or no?
16:57:03 **18** **A.** **That's too broad. I mean, I would say**
16:57:06 **19** **crushed particles of nonregulated asbestos fibers and**
16:57:13 **20** **bundles, the aspect ratio very rarely exceeds 3-to-1,**
16:57:18 **21** **4-to-1.**
16:57:19 **22** **Q.** Okay. ISO -- strike that.
16:57:24 **23** What is the average width of a tremolite
16:57:28 **24** fiber under the TEM?
16:57:31 **25** MR. CIRSCH: Object to form.
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16:57:31 **1** THE WITNESS: An individual fiber
16:57:32 **2** typically can run anywhere from about .2 to .4,
16:57:39 **3** seen some as high as .5 for an individual fiber.
16:57:42 **4** **Q.** (By Mr. Chachkes) Okay. Do you have a
16:57:44 **5** peer-reviewed reference to support that?
16:57:50 **6** MS. O'DELL: Your original question was
16:57:52 **7** what he had seen.
16:57:54 **8** MR. CHACHKES: Actually, no. The original
16:57:55 **9** question was what is the average width.
16:57:56 **10** THE WITNESS: I think if you look at Wylie
16:57:58 **11** and others, they say that single tremolite or
16:58:01 **12** single amphibole fibers very rarely exceed .5,
16:58:04 **13** .6. So there's a number of references out
16:58:07 **14** there. I can't remember all the citations, but
16:58:09 **15** there's a number of references on that.
16:58:11 **16** **Q.** (By Mr. Chachkes) The question is do you
16:58:12 **17** have a peer-reviewed reference to cite to to support
16:58:15 **18** your testimony that the average width of a tremolite
16:58:18 **19** fiber is usually between .2 and .4?
16:58:21 **20** MR. CIRSCH: Object to form.
16:58:22 **21** THE WITNESS: I've seen as high as .5.
16:58:25 **22** There's a range. And it's been published
16:58:28 **23** before, but no, I don't have the citation on me.
16:58:30 **24** **Q.** (By Mr. Chachkes) What's the average
16:58:31 **25** width of an anthophyllite fiber under TEM?
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16:58:37 **1** MR. CIRSCH: Object to form.
16:58:37 **2** THE WITNESS: Typically in the same range
16:58:40 **3** as tremolite.
16:58:41 **4** **Q.** (By Mr. Chachkes) And do you have a
16:58:44 **5** citation for a peer-reviewed paper to support that?
16:58:47 **6** **A. Not that I can rattle off the top of my**
16:58:51 **7 head, no, sir.**
16:58:52 **8** **Q.** What's the largest width an anthophyllite
16:58:54 **9** particle can have and still be characterized as a
16:58:57 **10** fiber under TEM?
16:59:00 **11** MR. CIRSCH: Object to form.
16:59:01 **12** MS. O'DELL: Would you repeat that,
16:59:03 **13** please?
16:59:03 **14** **Q.** (By Mr. Chachkes) What is the largest
16:59:04 **15** width of an anthophyllite particle -- strike that.
16:59:08 **16** What is the largest width an anthophyllite
16:59:10 **17** particle can have and still be characterized as a
16:59:12 **18** fiber under TEM?
16:59:14 **19** **A. Whatever width that will exceed equal to**
16:59:22 **20 5-to-1 aspect ratio. So it doesn't have a cutoff on**
16:59:26 **21 the width for a single fiber. As long as it**
16:59:32 **22 exceeds -- greater than or equal to 5 -- aspect ratio**
16:59:35 **23 of 5.**
16:59:36 **24** **Q.** So the width doesn't matter; it's the
16:59:38 **25** aspect ratio that matters?
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16:59:40 **1** **A. Correct.**
16:59:40 **2** **Q.** Okay. Do you have a reference,
16:59:43 **3** peer-reviewed reference, to cite for that?
16:59:45 **4** **A. Every one of the counting protocols do not**
16:59:48 **5 have a maximum on the width. They all have the same**
16:59:52 **6 counting protocol for the aspect ratios for the**
16:59:56 **7 length, for greater than .5 micrometers. So they're**
17:00:00 **8 all the same.**
17:00:01 **9** **I'm not aware of any of these**
17:00:02 **10 peer-reviewed publications, protocols, stating that**
17:00:08 **11 there is a maximum width.**
17:00:11 **12** MR. CIRSCH: We've been going about an
17:00:12 **13** hour, so when you get to the next spot, can we
17:00:15 **14** take a break?
17:00:16 **15** MR. CHACHKES: Sure. Give me maybe like 5
17:00:17 **16** more minutes; is that okay?
17:00:18 **17** MR. CIRSCH: It's up to the doctor.
17:00:18 **18** THE WITNESS: I would like to take a break
17:00:20 **19** now.
17:00:20 **20** **Q.** (By Mr. Chachkes) Okay. Can I just
17:00:22 **21** ask -- let me ask one more --
17:00:24 **22** **A. Okay.**
17:00:24 **23** **Q.** -- because it's just basically the same
17:00:25 **24** one, tremolite.
17:00:26 **25** What is the largest width a tremolite
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17:00:28 **1** particle can have and still be characterized as a
17:00:30 **2** fiber under TEM? Is it same answer?
17:00:32 **3** **A. It's the same answer. Now, we don't see**
17:00:34 **4 any single fibers with widths that exceed or that are**
17:00:39 **5 any width. I mean, it's in that range that I've**
17:00:42 **6 talked about.**
17:00:43 **7** **Typically, when it gets larger, it is a**
17:00:45 **8 bundle, and you can have -- we've had bundles as wide**
17:00:49 **9 as 1 to 2 micrometers in diameter, but that's made up**
17:00:53 **10 of -- something that big is made up tens to hundreds**
17:00:57 **11 of individual fibers.**
17:00:57 **12** **Q.** But hypothetically, you see a tremolite
17:00:58 **13** particle with a width of 1, you would still
17:01:01 **14** characterize that as a fiber if the aspect ratio was
17:01:06 **15** in the right range?
17:01:08 **16** MR. CIRSCH: Object to form.
17:01:09 **17** THE WITNESS: Hypothetically, because I
17:01:11 **18** don't believe we've ever seen one in any of
17:01:13 **19** these protocol -- any of these analyses. But if
17:01:14 **20** it has -- if it meets the peer-reviewed counting
17:01:18 **21** rules for regulated asbestos, yes, it would be
17:01:21 **22** counted, hypothetically.
17:01:23 **23** MR. CHACHKES: Okay. Let's take a break.
17:01:25 **24** (Recess from 5:01 p.m. to 5:20 p.m.)
17:21:00 **25** **Q.** (By Mr. Chachkes) Going back to
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17:21:07 **1** Exhibit 21, which is ISO 13794, now, 2.7, that's a

17:21:16 **2** definition of asbestos; correct?

17:21:20 **3** **A. 2.7?**

17:21:21 **4** **Q.** Yes. On page 2.

17:21:23 **5** **A. Oh.**

17:21:42 **6** **Q.** Is that a definition of asbestos?

17:21:45 **7** **A. That's their definition, yes, sir.**

17:21:47 **8** **Q.** Okay. Now, I've heard you use the phrase,

17:21:50 **9** the distinction, geological and regulatory

17:21:54 **10** definitions as if they were different. Which one is

17:21:57 **11** this?

17:21:58 **12** **A. It's just a general definition.**

17:22:04 **13** **Q.** Okay. It's not a geological definition,

17:22:07 **14** it's not a regulatory definition, it's just a

17:22:09 **15** definition?

17:22:10 **16** **A. Let's see. Crystallized in asbestiform**

17:22:14 **17** **habit. That's for both. Long, thin, flexible,**

17:22:18 **18** **strong fibers when crushed or processed. They don't**

17:22:20 **19** **define what strong is, but that's just a general**

17:22:23 **20** **definition.**

17:22:23 **21** **Q.** Okay. Is it your opinion that there's no

17:22:28 **22** such thing as a cleavage fragment for something that

17:22:31 **23** has a greater than 5-to-1 aspect ratio?

17:22:33 **24** **A. I never said that.**

17:22:34 **25** **Q.** Okay. Is there such a thing as a cleavage

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17:22:40 **1** fragment for something that has a greater than 5-to-1

17:22:41 **2** aspect ratio?

17:22:41 **3** **A. With parallel sides we've not seen one,**

17:22:44 **4** **but I guess hypothetically it's possible.**

17:22:46 **5** **Q.** Okay. Is there anything in the published

17:22:55 **6** literature that you've seen that suggests that there

17:22:58 **7** are cleavage fragments with a greater than 5-to-1

17:23:02 **8** aspect ratio?

17:23:02 **9** **A. There's been a number of published**

17:23:05 **10** **articles that state things like that, yes.**

17:23:08 **11** **Q.** Are there any published articles that

17:23:11 **12** state that there are cleavage fragments that have

17:23:13 **13** greater than 3-to-1 aspect ratio?

17:23:15 **14** **A. Yes, there is publications that state**

17:23:19 **15** **that.**

17:23:19 **16** **Q.** Okay. If I pulled a hand-sized amphibole

17:23:27 **17** rock out that had a greater than 5-to-1 aspect ratio,

17:23:32 **18** would you call that a fiber?

17:23:34 **19** **MR. CIRSCH: Object to form.**

17:23:34 **20** **THE WITNESS: If it is a rock and doesn't**

17:23:36 **21** **have any parallel sides that define a fiber, no.**

17:23:40 **22** **Q.** (By Mr. Chachkes) Does MAS have a

17:23:42 **23** protocol in place for describing the dimensions of

17:23:44 **24** fibers under the visual inspection under TEM?

17:23:47 **25** **A. Yes.**

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17:23:48 **1** **Q.** Is it written down?

17:23:51 **2** **A. Yes.**

17:23:51 **3** **Q.** Have you produced it?

17:23:53 **4** **A. No.**

17:23:54 **5** **MR. CHACHKES: Okay. We'd like that**

17:23:56 **6** **produced.**

17:23:56 **7** **MS. O'DELL: We'll consider it.**

17:23:57 **8** **Q.** (By Mr. Chachkes) Okay. Does MAS have a

17:23:58 **9** protocol in place for describing the dimensions of

17:24:01 **10** fibers -- sorry.

17:24:10 **11** **What do you call that protocol? Is there**

17:24:12 **12** **a name for it?**

17:24:13 **13** **A. Well, the protocol is the method we have**

17:24:16 **14** **here. It tells you how to make those measurements.**

17:24:18 **15** **It has -- the microscopes have calibrated concentric**

17:24:24 **16** **circles that allow you to make the measurements for**

17:24:28 **17** **greater than .5 micrometers. It is -- parallel sides**

17:24:33 **18** **is a visual determination.**

17:24:37 **19** **MR. CHACHKES: Let's look at that. Let's**

17:24:39 **20** **look at some TEM photomicrographs. Can we mark**

17:24:43 **21** **this Exhibit 22? Can we just put the sticker**

17:24:52 **22** **here so it doesn't obstruct anything?**

17:24:54 **23** **(Defendants' Exhibit 22 was marked for**

17:25:15 **24** **identification.)**

17:25:15 **25** **Q.** (By Mr. Chachkes) All right. Look at

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17:25:16 **1** Exhibit 22. Can you tell me what -- that very top

17:25:22 **2** row of three, is that asbestiform fibers, if you knew

17:25:28 **3** you were looking at an amphibole?

17:25:30 **4** **A. Top row, this one?**

17:25:32 **5** **Q.** Yeah.

17:25:34 **6** **A. Just looking at the photograph, I would**

17:25:38 **7** **state that that is a regulated asbestos size --**

17:25:41 **8** **asbestiform or not for these different photographs.**

17:25:41 **9** **Q.** All right.

17:25:48 **10** **A. Certainly one, I would say two. I'd have**

17:25:52 **11** **to be looking at that under a TEM to make that**

17:25:55 **12** **determination if it's asbestiform or not. It**

17:25:57 **13** **certainly has the aspect ratio; it has parallel**

17:26:01 **14** **sides. That would be a regulated asbestos, at least**

17:26:02 **15** **in TEM. It's unclear. This may be -- this may be**

17:26:10 **16** **optical microscopy.**

17:26:13 **17** **Q.** That third one on the very top row, what

17:26:17 **18** could you see under TEM or do under TEM that would

17:26:20 **19** make you say, oh, that's not regulated asbestos,

17:26:25 **20** assuming it's an amphibole?

17:26:26 **21** **A. Well I would have to be looking at it**

17:26:28 **22** **under the TEM so -- you're looking at an optical**

17:26:32 **23** **microscopy picture.**

17:26:33 **24** **Q.** But what is it you would be -- what is it

17:26:36 **25** that you could see under a TEM that would make you

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17:26:38 **1** think that's not -- because the aspect ratio
 17:26:40 **2** obviously is greater than 5-to-1; right?
 17:26:41 **3 A. Well, I would take a look at it and see**
 17:26:43 **4 parallel sides, is that multiple fibers. I don't**
 17:26:48 **5 know what magnification this is at.**
 17:26:50 **6 So again, I would prefer to be looking at**
 17:26:51 **7 something under a TEM than just play**
 17:26:54 **8 guess-what-this-is.**
 17:26:54 **9 Q. Okay. So it's possible what you're**
 17:26:56 **10 looking at there which has an aspect ratio of -- it's**
 17:27:00 **11 greater than 5-to-1; right?**
 17:27:01 **12 A. That's correct.**
 17:27:02 **13 Q. Okay. It's possible that that's not --**
 17:27:04 **14 that's nonasbestiform if it doesn't have parallel**
 17:27:08 **15 sides; is that true?**
 17:27:09 **16 A. Again, this is an optical microscopy**
 17:27:11 **17 picture. So unless I was looking at this under the**
 17:27:14 **18 TEM, but certainly has parallel sides. I don't know**
 17:27:17 **19 the width. I can't really make out the micron bar, I**
 17:27:21 **20 don't know the magnification.**
 17:27:22 **21 So you'll have to get some other expert to**
 17:27:25 **22 take a look at it, if he's willing to opine what that**
 17:27:29 **23 is versus the counting rules in the TEM.**
 17:27:32 **24 Q. In the second row, assuming that**
 17:27:36 **25 everything in the second row is amphibole, would you**
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17:27:40 **1** call those asbestiform or not?
 17:27:44 **2 A. Again, I'm looking at an optical**
 17:27:51 **3 microscopy picture. We've got a bundle that -- I**
 17:27:58 **4 mean, I can't look at the micron bar. Possibly just**
 17:28:01 **5 the one in the middle because you can see individual**
 17:28:03 **6 fibrils.**
 17:28:04 **7 Q. Okay. If you saw that under your TEM,**
 17:28:07 **8 would you label that as asbestos?**
 17:28:08 **9 A. Well, I'm not looking at it under TEM. So**
 17:28:13 **10 if it's under an optical microscopy method and it**
 17:28:16 **11 meets the definition, it's got parallel sides, it**
 17:28:20 **12 looks like it has multiple fibers in the bundle, that**
 17:28:23 **13 by definition is asbestiform.**
 17:28:25 **14 Q. And why do you say it looks like it has**
 17:28:28 **15 multiple fibers in the bundle?**
 17:28:29 **16 A. Because I can see them.**
 17:28:30 **17 Q. Okay. You're referring to the lines that**
 17:28:34 **18 go from the northwest towards the southeast starting**
 17:28:36 **19 in the top?**
 17:28:37 **20 A. Yes, sir.**
 17:28:37 **21 Q. Okay. In the third row, assuming those**
 17:28:40 **22 are amphiboles, do you have enough information to**
 17:28:44 **23 determine whether they're asbestiform?**
 17:28:46 **24 A. I can't really see what we have here under**
 17:28:50 **25 these. And I'm assuming the fourth and five row --**
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17:28:56 **1 Q. Well, let's not get ahead of ourselves.**
 17:29:00 **2 Now, in the third row, do you have enough**
 17:29:04 **3 information from these pictures to see whether**
 17:29:07 **4 they're bundles or fibers?**
 17:29:09 **5 A. No. It's too out of focus.**
 17:29:12 **6 Q. Okay.**
 17:29:12 **7 A. I would -- looks like you have dark field**
 17:29:15 **8 here. I would have to see this in the TEM.**
 17:29:17 **9 Q. Okay. In the second row, far left, do you**
 17:29:21 **10 have enough -- does it appear to you whether there**
 17:29:24 **11 are bundles or fibers?**
 17:29:25 **12 A. No, you can't make out. Most of these are**
 17:29:27 **13 just particles. And I would have to be looking at**
 17:29:31 **14 this one that has parallel sides. But I would have**
 17:29:36 **15 to be determining if I could see individual fibers in**
 17:29:38 **16 it or not.**
 17:29:39 **17 Q. In the fourth row, second from the bottom,**
 17:29:46 **18 are these asbestiform?**
 17:29:48 **19 A. Maybe.**
 17:29:50 **20 Q. What additional information would you need**
 17:29:53 **21 to determine that?**
 17:29:53 **22 A. I need to be looking at it in the TEM**
 17:29:58 **23 or -- so that I can make a determination. The size,**
 17:30:02 **24 the magnification.**
 17:30:08 **25 Q. Do you have enough information in the**
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17:30:10 **1** second -- in that second-to-last row, those three
 17:30:13 **2** pictures, to determine whether that's asbestiform?
 17:30:15 **3 A. I wouldn't make that call either way**
 17:30:19 **4 unless I could be looking at it under the TEM. It**
 17:30:22 **5 looks like very little magnification. And I**
 17:30:25 **6 apologize, but they're fairly poor photographs.**
 17:30:28 **7 Q. Okay. In the last row, same question. In**
 17:30:31 **8 those three pictures at the very bottom of**
 17:30:34 **9 Exhibit 22, are those -- see the single fibers -- the**
 17:30:37 **10 single item in the middle, would you call that**
 17:30:40 **11 asbestiform?**
 17:30:41 **12 A. It has parallel sides. I can't see**
 17:30:48 **13 individual fibers. But I would call that a regulated**
 17:30:52 **14 asbestos fiber or bundle, maybe.**
 17:30:55 **15 Again, I would need to be looking at the**
 17:30:57 **16 TEM analysis of these or at least better photographs.**
 17:31:01 **17 Q. Okay. So the bottom six are all TEM**
 17:31:08 **18 photomicrographs from you? You realize that; right?**
 17:31:12 **19 MR. CIRSCH: Object to form.**
 17:31:13 **20 THE WITNESS: And that's fine. If you**
 17:31:14 **21 tell me which ones they are, at least I can get**
 17:31:17 **22 better images.**
 17:31:17 **23 Q. (By Mr. Chachkes) These are the images**
 17:31:20 **24 you provided to us; right?**
 17:31:22 **25 A. Well, when we provide the book, we provide**
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17:31:25 **1 a large photograph that has better resolution,**
 17:31:30 **2 et cetera.**
 17:31:33 **3 Q.** Okay. Yeah, let's go look at -- let's
 17:31:35 **4** look in the book, the upper left. So from the
 17:31:38 **5** bottom -- what?
 17:31:44 **6** MS. TROVATO: I'll let you know which one
 17:31:45 **7** I have marked.
 17:31:47 **8** MR. CHACHKES: Okay. I'm going to grab
 17:31:48 **9** one for you from the book. Just tear it out.
 17:31:54 **10** Okay. Let's mark it as Exhibit 23.
 17:31:59 **11** (Defendants' Exhibit 23 was marked for
12 identification.)
 17:32:21 **13** (Off the record.)
 17:32:21 **14 Q.** (By Mr. Chachkes) Okay. So around
 17:32:23 **15** page 985. Okay. So this one corresponds to second-
 17:32:28 **16** to-the-last row, far right; correct?
 17:32:34 **17 A. Yes.**
 17:32:34 **18 Q.** Okay. Are you looking at something that's
 17:32:36 **19** asbestiform there?
 17:32:37 **20 A. I'm looking at a regulated asbestos**
 17:32:43 **21 structure. We have talc underneath it. But I would**
 17:32:46 **22 see individual fibers -- you know, I'm not on the**
 17:32:51 **23 TEM. This is only 1/2 micrometer in width, but it**
 17:32:54 **24 looks like we have individual fibers in here. So**
 17:32:56 **25 yes.**
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17:32:56 **1 Q.** Okay. Is this -- so for those of us who
 17:33:03 **2** are trying to determine whether you made the right
 17:33:05 **3** call, is this photomicrograph enough to determine the
 17:33:08 **4** morphology of what we're looking at?
 17:33:13 **5 A. Yes.**
 17:33:14 **6 Q.** Okay. In your old reports, the reports
 17:33:33 **7** that were the non-MDL samples, would you agree that
 17:33:36 **8** you characterized the majority of the particles
 17:33:38 **9** identified as fibrous, not bundles?
 17:33:41 **10** MR. CIRSCH: Object to form.
 17:33:42 **11** THE WITNESS: I don't think I ever counted
 17:33:45 **12** them up.
 17:33:45 **13 Q.** (By Mr. Chachkes) Okay. In your MDL --
 17:33:50 **14** but the majority, the large majority is fiber, not
 17:33:53 **15** bundles in the old MDL reports?
 17:33:56 **16** MS. O'DELL: Object to form.
 17:33:56 **17** THE WITNESS: I'm not sure I agree with
 17:33:58 **18** that.
 17:33:58 **19 Q.** (By Mr. Chachkes) I'm sorry, the old
 17:33:59 **20** non-MDL reports.
 17:34:00 **21 A. I'd have to look at them to see if I agree**
 17:34:03 **22 with that or not.**
 17:34:03 **23 Q.** Okay. In your new -- the MDL reports,
 17:34:07 **24** about 96 percent of the particles your analysts
 17:34:11 **25** identify are bundles; correct?
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17:34:12 **1 A. Correct.**
 17:34:12 **2 Q.** If there's a stark difference between the
 17:34:18 **3** ratio of fibers to bundle found as compared between
 17:34:21 **4** the MDL sample analysis and the non-MDL sample
 17:34:25 **5** analysis, what would explain that?
 17:34:26 **6** MR. CIRSCH: Object to form.
 17:34:27 **7** THE WITNESS: That there was more bundles
 17:34:29 **8** than fibers.
 17:34:30 **9 Q.** (By Mr. Chachkes) Aren't they supposed to
 17:34:31 **10** be the same thing, representative sample of J&J talc?
 17:34:35 **11** MR. CIRSCH: Object to form.
 17:34:35 **12** THE WITNESS: Not necessarily.
 17:34:36 **13 Q.** (By Mr. Chachkes) Why not?
 17:34:37 **14 A. It's just a matter of where -- the area in**
 17:34:40 **15 the mine and what was dug out, if that was correct,**
 17:34:42 **16 then we should say that all J&J talc has these**
 17:34:46 **17 concentrations of asbestos. So that doesn't bother**
 17:34:50 **18 me.**
 17:34:50 **19 Q.** You think it might be random chance that
 17:34:55 **20** the same mine samples in your old reports you report
 17:35:00 **21** majority of fibers, and in your new reports you
 17:35:04 **22** report as almost exclusively bundles?
 17:35:06 **23** MR. CIRSCH: Object to form.
 17:35:08 **24** THE WITNESS: We just call them as we see
 17:35:09 **25** them.
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17:35:10 **1 Q.** (By Mr. Chachkes) But is it random
 17:35:11 **2** chance? That's what I'm asking.
 17:35:12 **3 A. I don't know if it's random chance or not.**
 17:35:16 **4 These are what we distinguish as fibers and bundles.**
 17:35:20 **5 Q.** Okay. One would expect a random sample of
 17:35:23 **6** bottles from a Vermont mine over time to have the
 17:35:27 **7** same ratio whether you are looking last year or this
 17:35:30 **8** year; right?
 17:35:31 **9** MR. CIRSCH: Object to form.
 17:35:32 **10** THE WITNESS: I'm only aware of in the old
 17:35:36 **11** samples that there was two that could be said
 17:35:39 **12** came from Vermont. So we're looking at a much
 17:35:42 **13** bigger population of Vermont samples than we
 17:35:45 **14** were of the originals. And one of those was a
 17:35:50 **15** MDL sample. So you're comparing apples and
 17:35:54 **16** oranges.
 17:35:55 **17 Q.** (By Mr. Chachkes) What about the Italian?
 17:35:56 **18 A. The Italian, I'd have to look at it and**
 17:36:01 **19 count them up because there wasn't that many fibers**
 17:36:04 **20 as compared to the others, so we have a bigger pool**
 17:36:06 **21 of fibers and bundles.**
 17:36:07 **22 Q.** If you did the entire set of MDL samples
 17:36:10 **23** over again, would you expect to find the same ratio
 17:36:13 **24** of bundles to fibers?
 17:36:17 **25** MR. CIRSCH: Object to form.
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17:36:17 1 THE WITNESS: I don't have any expectation
17:36:19 2 of what we're going to find or what we expect.
17:36:21 3 We just count using the protocols and make the
17:36:25 4 decision on what morphology it is.
17:36:27 5 Q. (By Mr. Chachkes) Okay. Have you
17:36:28 6 testified that the modified Blount TEM method you
17:36:31 7 employed in your March 2018 report is materially
17:36:35 8 identical to the ISO 22262?
17:36:37 9 A. **I don't think I -- it's not identical.**
17:36:43 10 **The old Blount report uses a different heavy density**
17:36:47 11 **liquid separation. But the ISO, we can use the same**
17:36:52 12 **spin rate, same time for rpm and spin rate.**
17:36:59 13 **But the difference is the -- even the old**
17:37:03 14 **Blount is the same. And that's -- what's interesting**
17:37:06 15 **about the ISO 22262-2, it gives you the leeway to use**
17:37:11 16 **whatever you need to use. And the only thing it**
17:37:16 17 **really specifies is the density of the heavy liquid.**
17:37:21 18 Q. You used the Blount TEM method in your
17:37:23 19 March 2018 report; correct?
17:37:24 20 A. **Correct.**
17:37:24 21 Q. Was it materially identical to what's
17:37:28 22 mandated in ISO 22262?
17:37:32 23 A. **ISO 22262 doesn't mandate any particular**
17:37:35 24 **conditions. So you can use whatever procedures you**
17:37:41 25 **feel work the best. And that's because the spin**
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17:37:45 1 **rates and rpm does not really affect the overall**
17:37:48 2 **concentrations, and it happened to be the same**
17:37:51 3 **density, liquid density.**
17:37:53 4 Q. You've testified that the same four
17:37:56 5 associates at MAS have conducted all of MAS's
17:37:58 6 analysis of Johnson's Baby Powder in your reports
17:38:01 7 going all the way back to 2017; is that correct?
17:38:03 8 MR. CIRSCH: Object to form.
17:38:04 9 THE WITNESS: We have some of the same
17:38:08 10 people, yes.
17:38:09 11 Q. (By Mr. Chachkes) Okay. What about are
17:38:11 12 they the same? Is it the same people who were
17:38:13 13 doing -- analyzing Johnson Baby Powder in early 2017
17:38:19 14 as are doing it now?
17:38:22 15 A. **You'll have to clarify that question.**
17:38:25 16 Q. Well, there were four people doing
17:38:28 17 analysis in the MDL report; right?
17:38:30 18 A. **Correct.**
17:38:30 19 Q. There are four people doing analysis in
17:38:33 20 the reports that rely on research all the way back
17:38:39 21 to -- analysis all the way back to 2017; correct?
17:38:42 22 A. **I'd have to look at that.**
17:38:43 23 Q. Okay. I'm asking is it the same four
17:38:46 24 people? You don't know?
17:38:48 25 MR. CIRSCH: Object to the form.
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17:38:49 1 THE WITNESS: I'd have to look and see who
17:38:50 2 the four people are because there are some folks
17:38:53 3 who started doing, you know, analysis now may
17:38:57 4 not have been doing analysis then, and there's
17:38:59 5 some folks doing analysis then that are not
17:39:02 6 doing analysis now. It's just easy to look in
17:39:05 7 the count sheets and see if they're the same or
17:39:08 8 not.
17:39:08 9 Q. (By Mr. Chachkes) Is there additional
17:39:12 10 data concerning the samples upon which you reported
17:39:15 11 for TEM that is in a file somewhere in your
17:39:20 12 laboratory but not printed out and not produced?
17:39:22 13 A. **All the data for these particular samples**
17:39:25 14 **are here.**
17:39:25 15 Q. Okay. Was there any data generated in
17:39:28 16 connection with the TEM analysis in this case that
17:39:30 17 was thrown away or deleted?
17:39:32 18 A. **No, not that I'm aware of.**
17:39:34 19 Q. You personally have not conducted any of
17:39:37 20 the PLM testing included in your MDL report; correct?
17:39:40 21 A. **That is correct.**
17:39:40 22 Q. Did you sit with your analysts as they did
17:39:42 23 the PLM testing?
17:39:45 24 A. **I have probably looked in that optical**
17:39:47 25 **microscope 50 times in the last two months.**
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17:39:50 1 Q. So when you say you've looked in it,
17:39:52 2 you've looked in it while your analysts were testing
17:39:58 3 MDL samples for the purposes of your current report?
17:40:00 4 A. **Well, you can't -- both of you can't look**
17:40:02 5 **in the microscope at the same time. A lot of times**
17:40:05 6 **it's on the monitor that we use so that we can**
17:40:09 7 **increase the sensitivity. But, no, I don't**
17:40:12 8 **personally do the PLM analysis.**
17:40:14 9 Q. Yeah, but I'm trying to get the sense of
17:40:16 10 were you actively involved looking through the
17:40:20 11 microscope or looking along with the other person
17:40:23 12 into the microscope for the PLM that's reported on in
17:40:25 13 the MDL?
17:40:27 14 A. **I have been active with the PLM**
17:40:29 15 **microscopists looking at structures, looking at**
17:40:34 16 **different aspects of it, but ultimately he makes the**
17:40:38 17 **decision.**
17:40:38 18 Q. Okay. So the decisions -- the opinions in
17:40:43 19 your report about whether the PLM was a positive for
17:40:46 20 asbestos, those are the opinions of your analysts?
17:40:50 21 A. **It's not an opinion.**
17:40:51 22 MS. O'DELL: Form.
17:40:52 23 THE WITNESS: It meets the definition. It
17:40:54 24 has the right crystalline information. It meets
17:40:58 25 all the different definitions. To me, that is
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17:41:00 **1** not an opinion.

17:41:01 **2** **Q.** (By Mr. Chachkes) Okay. Those are the

17:41:03 **3** conclusions of your analysts?

17:41:05 **4** **A. Yes.**

17:41:06 **5** **Q.** Okay. You have personally never tested a

17:41:08 **6** talc sample for asbestos from start to finish

17:41:10 **7** yourself?

17:41:11 **8** **A. That is correct.**

17:41:11 **9** **Q.** You're not trained in using PLM for the

17:41:14 **10** purposes of testing talc for asbestos?

17:41:17 **11** MR. CIRSCH: Object to form.

17:41:18 **12** THE WITNESS: I have not taken a PLM

17:41:20 **13** course for asbestos.

17:41:20 **14** **Q.** (By Mr. Chachkes) You've not published

17:41:25 **15** any PLM methodologies?

17:41:27 **16** **A. No, sir. We're not using our**

17:41:29 **17** **methodologies. We're using the standard protocol**

17:41:33 **18** **methodologies. So if we were to publish -- when we**

17:41:36 **19** **publish this, we would be publishing that this is the**

17:41:39 **20** **method we used. That's like everybody else.**

17:41:42 **21** **Q.** Have you published any PLM work testing

17:41:44 **22** for asbestos in any context?

17:41:47 **23** **A. Yes.**

17:41:51 **24** **Q.** What is it?

17:41:52 **25** **A. Our gasket study, our vermiculite studies,**

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17:41:59 **1** **our -- that have been published. A number of papers**

17:42:03 **2** **are published where it's going to be a study on**

17:42:05 **3** **exposure. You usually have to determine what the**

17:42:08 **4** **concentration of asbestos is in the materials before**

17:42:11 **5** **you publish that.**

17:42:12 **6** **Q.** Those are published in peer-reviewed

17:42:14 **7** literature?

17:42:14 **8** **A. Yes, sir.**

17:42:15 **9** **Q.** Okay. But those are not finding asbestos

17:42:17 **10** in talc; right?

17:42:21 **11** **A. No, sir. These are all construction**

17:42:25 **12** **products.**

17:42:26 **13** **Q.** Are you an expert in PLM?

17:42:30 **14** **A. I think I know more than the average**

17:42:32 **15** **layperson.**

17:42:32 **16** **Q.** Are you an expert in PLM?

17:42:36 **17** MR. CIRSCH: Object to form.

17:42:37 **18** THE WITNESS: Again, that's up to a judge

17:42:38 **19** to be an expert.

17:42:39 **20** I know how the analysis is done, I could

17:42:42 **21** do an analysis if I -- it would take me a lot

17:42:46 **22** longer than what people typically do.

17:42:47 **23** **Q.** (By Mr. Chachkes) One of the

17:42:48 **24** disadvantages of PLM that you cite is that it cannot

17:42:51 **25** resolve particles less than 1/2 micrometer; is that

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17:42:56 **1** correct?

17:42:56 **2** **A. Individual fibers, unless they have a**

17:42:58 **3** **number of fibers in a bundle. But we don't see**

17:43:00 **4** **individual fibers. In fact, we haven't seen any**

17:43:04 **5** **individual fiber in any of these analyses that we've**

17:43:07 **6** **done. They've all been very large bundles.**

17:43:09 **7** **Q.** Is it unambiguously true that asbestos

17:43:19 **8** particles must be at least 1/2 micrometer in the

17:43:21 **9** smallest dimension to be visible under PLM?

17:43:23 **10** **A. That's what's stated. We never see**

17:43:25 **11** **individual fibers of any size. Everything that we**

17:43:30 **12** **have run across is these very large bundles that have**

17:43:33 **13** **multiple fibers in them.**

17:43:35 **14** **Q.** But I'm talking about not what you're

17:43:37 **15** actually seeing, but this is a matter of the

17:43:41 **16** resolution.

17:43:42 **17** Must asbestos particles be at least 1/2

17:43:44 **18** micrometer in the smallest dimension to be visible

17:43:49 **19** under PLM?

17:43:49 **20** **A. It may be visible, but it's hard to go**

17:43:53 **21** **through the dispersion staining and everything**

17:43:55 **22** **associated to make a positive identification.**

17:43:57 **23** **So maybe theoretically that's possible,**

17:44:01 **24** **but it's not something that's routinely seen, that I**

17:44:04 **25** **know of.**

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17:44:04 **1** **Q.** Do you have the ability to detect asbestos

17:44:08 **2** fibers with a width of approximately .3 micrometers

17:44:13 **3** by PLM?

17:44:15 **4** **A. Again, it may be theoretically possible,**

17:44:19 **5** **but I'm not aware that it's routinely done. We've**

17:44:23 **6** **never seen any in the cosmetic talc.**

17:44:25 **7** **Q.** Shouldn't the particle distribution be on

17:44:33 **8** a bell curve so that you would expect that some

17:44:37 **9** exist?

17:44:37 **10** MR. CIRSCH: Object to form.

17:44:38 **11** THE WITNESS: I'm sure there is -- it is

17:44:41 **12** in there because a lot of these we have positive

17:44:43 **13** TEMs. But these two techniques have different

17:44:47 **14** size distributions that they can see or they can

17:44:49 **15** resolve or not resolve to be able to absolutely

17:44:52 **16** determine if it is regulated asbestos or not.

17:44:56 **17** **Q.** (By Mr. Chachkes) Is it your position

17:45:01 **18** that particles below 1/2 micrometer are not

17:45:04 **19** resolvable because your analysts have never observed

17:45:08 **20** particles of that width or smaller?

17:45:09 **21** **A. It's my position that these are fibers,**

17:45:12 **22** **and single fibers are not being resolved in this**

17:45:15 **23** **matrix or seen by the PLM.**

17:45:20 **24** **Q.** Is that because your analysts haven't

17:45:22 **25** observed it, or is it just because of the nature of

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17:45:24 **1** the devices? Do you have some higher level
 17:45:27 **2** understanding of the nature of the devices?
 17:45:29 **3** MR. CIRSCH: Object to form.
 17:45:30 **4** **Q.** (By Mr. Chachkes) It is empirical or is
 17:45:32 **5** it something different?
 17:45:32 **6** MR. CIRSCH: Object to form.
 17:45:33 **7** THE WITNESS: I don't know if it's
 17:45:36 **8** empirical or not.
 17:45:37 **9** I mean, we haven't answered all the
 17:45:40 **10** questions about the PLM analysis of cosmetic
 17:45:43 **11** talc. But we do know that to do a PLM analysis
 17:45:48 **12** properly, you have to spend the time necessary.
 17:45:51 **13** You have to look at the sample in dispersion
 17:45:56 **14** staining. You need a high definition camera as
 17:45:58 **15** well as a monitor so that you can resolve and
 17:46:02 **16** get the focal plane necessary to see individual
 17:46:04 **17** fibers.
 17:46:06 **18** But we haven't run across individual
 17:46:08 **19** fibers. I know every protocol says, well, you
 17:46:10 **20** can see down to .5, you can see down to .3.
 17:46:14 **21** There's one thing about seeing them. There's
 17:46:16 **22** another thing going through the process of being
 17:46:18 **23** able to see the colors in the dispersion
 17:46:21 **24** staining, the extinction angle.
 17:46:24 **25** I just don't know if that's really
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17:46:26 **1** possible because this type of matrix that we're
 17:46:30 **2** looking at is so different than what PLM
 17:46:32 **3** analysts are typically dealing with.
 17:46:35 **4** **Q.** (By Mr. Chachkes) Did MAS test any talcum
 17:46:41 **5** powder samples with the ISO 22262 method prior to the
 17:46:44 **6** analysis included in your reports in this case?
 17:46:47 **7** MR. CIRSCH: Object to form.
 17:46:48 **8** THE WITNESS: No. I mean, we may have --
 17:46:51 **9** you know, we're slowly trying to work through
 17:46:54 **10** the old non-MDLs so that we can compare apples
 17:46:58 **11** to oranges. But when we get done with that,
 17:47:03 **12** we'll issue another report.
 17:47:03 **13** **Q.** (By Mr. Chachkes) Have you analyzed the
 17:47:05 **14** old talcum powder samples under ISO 22262 recently?
 17:47:12 **15** **A. I don't know. I haven't been focused in**
 17:47:15 **16 on that. There may be some done.**
 17:47:17 **17** **Q.** Is it possible -- strike that.
 17:47:22 **18** ISO 22262 method is promulgated by the
 17:47:28 **19** International Organization for Standardization; is
 17:47:28 **20** that correct?
 17:47:29 **21** **A. Yes, sir.**
 17:47:29 **22** **Q.** Are you currently a member of any of the
 17:47:32 **23** ISO national standards bodies?
 17:47:33 **24** **A. I am not.**
 17:47:34 **25** **Q.** Did you vote on any of the ISO standards?
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17:47:37 **1** **A. I did not.**
 17:47:39 **2** **Q.** Did you participate in the drafting of any
 17:47:42 **3** ISO standards?
 17:47:43 **4** **A. I did not.**
 17:47:44 **5** **Q.** Have you spoken with any of the authors of
 17:47:46 **6** any of the ISO standards that we talked about today?
 17:47:50 **7** **A. Not in some time, but not specifically**
 17:47:53 **8 about the 22262-1 and 2.**
 17:47:55 **9** **Q.** What about 3?
 17:47:57 **10** **A. No, sir, I haven't spoken to anybody about**
 17:48:00 **11 3 -- any of the authors of 3.**
 17:48:01 **12** **Q.** Which of the three parts of the ISO 22262
 17:48:06 **13** did your analysts employ in the analysis of the ISO
 17:48:11 **14** PLM portion of your report?
 17:48:15 **15** MR. CIRSCH: Object to form.
 17:48:16 **16** THE WITNESS: All the counting rules, all
 17:48:18 **17** the -- what's defined as asbestiform, what's the
 17:48:22 **18** 20-to-1. Everything that's used in there.
 17:48:26 **19** **Q.** (By Mr. Chachkes) So you're saying it
 17:48:28 **20** didn't matter, it's the same in all of 1 -- part 1,
 17:48:31 **21** part 2, and part 3?
 17:48:32 **22** **A. Well, I misunderstood the question.**
 17:48:34 **23** **Q.** Yeah, let me ask it again a little better.
 17:48:36 **24** Which of part 1, part 2, or part 3 did
 17:48:41 **25** your analysts use when they analyzed the MDL samples
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17:48:48 **1** under PLM?
 17:48:49 **2** **A. Part 1.**
 17:48:49 **3** **Q.** Do you know when those methods in part 1
 17:48:53 **4** were promulgated?
 17:48:55 **5** **A. Looks like 2012/07/01.**
 17:49:06 **6** **Q.** What do you mean by 2012/07/01?
 17:49:12 **7** **A. I'm just looking at when it says it was**
 17:49:14 **8 issued. ISO -- so it has 2012, first edition, and I**
 17:49:22 **9 don't know if they're using 07 as the day and 01 as**
 17:49:26 **10 the month or the other way around.**
 17:49:27 **11** **Q.** So part 1 was promulgated in 2012?
 17:49:31 **12** **A. Yes, sir.**
 17:49:31 **13** **Q.** Okay. Are you aware of any other talc
 17:49:34 **14** testing methods published in the scientific
 17:49:36 **15** literature from 1991 to 2014 that include a
 17:49:41 **16** concentration method?
 17:49:43 **17** **A. Let's see. When was --**
 17:49:46 **18** **Q.** You should use yours.
 17:49:49 **19** **A. I'm just looking at the date.**
 17:49:51 **20** **This one was 2014.**
 17:49:53 **21** **Q.** You say this one's part 2; correct?
 17:49:55 **22** **A. Part 2.**
 17:49:55 **23** **Q.** Yeah. So I'm saying between 1991 and
 17:49:58 **24** 2014, are you aware of any testing -- talc testing
 17:50:01 **25** methods in the published scientific literature that
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17:50:03 1 include a concentration method?

17:50:16 2 A. The 1989 and 1990 papers published by

17:50:19 3 Blount. She's analyzing talc. She's using the

17:50:23 4 concentration method.

17:50:25 5 Q. Are you aware of any other?

17:50:27 6 A. That specifically say talc, no.

17:50:30 7 Q. Are you aware of any other talc testing

17:50:33 8 methods published in the scientific literature prior

17:50:36 9 to 1991 that include a concentration method?

17:50:39 10 A. Not in the published literature, no.

17:50:44 11 Q. One strength of PLM is that it can provide

17:50:48 12 a qualitative estimate of the weight percentage of

17:50:52 13 asbestos; true?

17:50:53 14 A. That is a strength, yes.

17:50:55 15 Q. What does the word qualitative mean in

17:50:58 16 that answer?

17:50:59 17 A. That it's an estimate based on

17:51:01 18 petrographic standards for how much material is --

17:51:09 19 that you're estimating on.

17:51:11 20 Q. Your analysts conducted a visual

17:51:14 21 estimation of the concentration of asbestos fibers in

17:51:16 22 the talc samples?

17:51:17 23 A. Asbestos bundles, yes, sir.

17:51:19 24 Q. Okay. Your report also references

17:51:25 25 generated weight percentage standards; correct?

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17:51:29 1 A. Yes.

17:51:29 2 Q. How were your lab's weight percentage

17:51:33 3 standards generated?

17:51:35 4 A. You mean the spike samples?

17:51:37 5 Q. Yes.

17:51:37 6 A. Taking that one JBP, I think it's number

17:51:51 7 13, and then you mix the appropriate materials

17:51:53 8 together so that you get a weight percent -- a

17:51:58 9 weighted percent, where you put -- say,

17:52:02 10 hypothetically, you know, 5 grams of tremolite and

17:52:05 11 then you then dilute the sample with additional talc

17:52:08 12 to make it .1 or .2 or .3. Standard method.

17:52:13 13 Q. Okay. Did you produce those generated

17:52:16 14 calculations?

17:52:17 15 A. No.

17:52:18 16 Q. Okay. We request that you produce those.

17:52:20 17 In your report you write that for positive

17:52:25 18 samples a visual estimation of the quantity of

17:52:28 19 asbestos observed was based on eye calibration

17:52:32 20 through review of lab-generated weight percentage

17:52:36 21 standards.

17:52:36 22 Does that ring a bell?

17:52:38 23 A. Yes.

17:52:38 24 Q. What is eye calibration?

17:52:39 25 A. It's a petrographic term for when you're

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17:52:41 1 looking at the area that is covered by the asbestos

17:52:45 2 versus the area that you're looking at. So there's

17:52:48 3 calibrated petrographic materials to help optical

17:52:54 4 microscopists to make these qualitative estimates.

17:52:58 5 Q. How often do you update your lab's weight

17:53:02 6 percentage standards?

17:53:03 7 A. I think we updated them the last time we

17:53:08 8 sent stuff to Lee Poye.

17:53:10 9 Q. And what regularity -- with what

17:53:14 10 regularity do you update those?

17:53:17 11 A. We don't have a regulatory. We make new

17:53:19 12 standards and send them off; and if we need

17:53:22 13 additional standards, we make them again.

17:53:24 14 Q. Who generated those standards?

17:53:25 15 A. Victoria Panariello.

17:53:28 16 Q. Okay. Did you monitor her when she did

17:53:31 17 that?

17:53:32 18 A. Did I sit here and -- stand there and

17:53:34 19 watch her? No.

17:53:35 20 Q. Did you monitor her in any other way?

17:53:37 21 A. No.

17:53:37 22 Q. Are you aware your method includes a

17:53:41 23 qualification that visual estimations of asbestos

17:53:43 24 concentrations pursuant to this method have been

17:53:46 25 demonstrated to consistently yield an overestimate of

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17:53:49 1 the proportion of asbestos?

17:53:53 2 MS. O'DELL: Object to the form.

17:53:54 3 THE WITNESS: I'm sorry, where is this

17:53:55 4 stated?

17:53:56 5 Q. (By Mr. Chachkes) In one of the ISO

17:53:57 6 documents that you're referring to, does it say that

17:54:00 7 this method that we're talking about consistently

17:54:04 8 yields an overestimate of the proportion of asbestos?

17:54:08 9 Are you aware of that?

17:54:09 10 A. I don't recall that.

17:54:10 11 Q. Okay. Do you believe that this

17:54:16 12 methodology we're talking about consistently yields

17:54:18 13 an overestimate of the proportion of asbestos?

17:54:20 14 A. No.

17:54:20 15 Q. Did your analyst use a point counting

17:54:45 16 method?

17:54:46 17 A. No.

17:54:46 18 Q. ISO 22262-2 includes a method for point

17:54:51 19 counting by PLM; correct?

17:54:53 20 A. It does.

17:54:54 21 Q. So instead of following the point counting

17:55:01 22 method in ISO 22262-2, you used an estimation based

17:55:07 23 on eyeball?

17:55:10 24 MR. CIRSCH: Form.

17:55:11 25 THE WITNESS: Estimation-based typical PLM

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17:55:12 **1** analysis, that's also in the 22262-1. They give
17:55:16 **2** you both, the ability to do either one.
17:55:19 **3** **Q.** (By Mr. Chachkes) I'm talking about
17:55:21 **4** 22262-2, is there the eyeballing method in 22262-2?
17:55:27 **5** MR. CIRSCH: Object to form.
17:55:27 **6** THE WITNESS: We only do the section 16,
17:55:30 **7** section 14 in the counting rules for TEM in the
17:55:35 **8** ISO 22262-2.
17:55:37 **9** **Q.** (By Mr. Chachkes) So is it your opinion
17:55:38 **10** that the ISO 22262-2 point counting method is not
17:55:44 **11** required; it's just merely optional?
17:55:48 **12** **A. 22262, if you are going to do PLM, it goes**
17:55:52 **13 back to the 1, and it provides you the ability to do**
17:55:55 **14 either/or.**
17:55:56 **15** **Q.** Okay. So it's your opinion that point
17:55:59 **16** counting in 22262-2 is optional?
17:56:03 **17** MR. CIRSCH: Object to form.
17:56:03 **18** THE WITNESS: You're going to have to show
17:56:05 **19** me where the point counting is in 22262-2.
17:56:09 **20** **Q.** (By Mr. Chachkes) Okay. Sitting here
17:56:10 **21** today, rather than burning the time on that, do you
17:56:16 **22** have any reason to believe it's not optional, that it
17:56:18 **23** was required, you just didn't do it?
17:56:20 **24** MS. O'DELL: Object to the form.
17:56:21 **25** THE WITNESS: No, I don't believe that.
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17:56:23 **1** **Q.** (By Mr. Chachkes) Okay. Do you have any
17:56:23 **2** reason to believe it's optional and so you had the
17:56:28 **3** option of not going it?
17:56:29 **4** MS. O'DELL: Object to form.
17:56:30 **5** MR. CIRSCH: Object to form.
17:56:30 **6** THE WITNESS: We follow the 22262-1 PLM
17:56:34 **7** method. It provides the ability to do both
17:56:37 **8** types of estimation. And point counting is
17:56:41 **9** another type of estimation.
17:56:43 **10** **Q.** (By Mr. Chachkes) For those particles
17:56:44 **11** that you determined were asbestiform in your report,
17:56:48 **12** for each one, is it your opinion that these are
17:56:51 **13** minerals with a fibrosity in which the fibers and
17:56:57 **14** fibrils possess a high tensile strength and
17:57:00 **15** flexibility?
17:57:01 **16** MR. CIRSCH: Object to form.
17:57:01 **17** MS. O'DELL: Would you repeat that,
17:57:02 **18** please?
17:57:03 **19** MR. CHACHKES: Can you read that back?
17:57:24 **20** (The record was read by the reporter.)
17:57:24 **21** MR. CIRSCH: Object to form.
17:57:25 **22** THE WITNESS: Again -- I guess we could
17:57:27 **23** rehash this -- that is a general definition.
17:57:29 **24** The protocol does not provide you any
17:57:31 **25** methodology to determine high tensile strength
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17:57:35 **1** or any tensile strength.
17:57:38 **2** It does not define what high is. It does
17:57:40 **3** not define how you determine flexibility on a
17:57:43 **4** microscopic scale.
17:57:45 **5** I guess that is just an opinion of
17:57:48 **6** somebody taking a look at it. But it's not
17:57:51 **7** required for this analysis.
17:57:53 **8** **Q.** (By Mr. Chachkes) I'm not asking a
17:57:55 **9** question at all about what's required. I'm asking
17:57:57 **10** about what your opinion is. Do the fibers you
17:58:02 **11** identified as asbestiform in your report possess high
17:58:06 **12** tensile strength and flexibility?
17:58:08 **13** MR. CIRSCH: Object to form.
17:58:09 **14** **Q.** (By Mr. Chachkes) Did you determine that?
17:58:10 **15** **A. You can't determine it. The protocol**
17:58:12 **16 doesn't tell you how to determine it. It doesn't**
17:58:14 **17 provide any guidance on how to determine it. It**
17:58:16 **18 doesn't tell you what, quote, high tensile strength**
17:58:20 **19 is.**
17:58:21 **20 High tensile strength to me, personally,**
17:58:21 **21 probably 100 psi. I don't think that's what they**
17:58:25 **22 mean, but at least there should be some guidance of**
17:58:28 **23 some sort to say, okay, somehow you have to put an**
17:58:30 **24 Instron inside your optical microscope and grab a**
17:58:35 **25 microscopic bundle and put it in the Instron and then**
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17:58:37 **1 measure the tensile strength, and it has to be over**
17:58:41 **2 5,000 psi. None of that exists.**
17:58:43 **3 A methodology is supposed to -- for a**
17:58:46 **4 person using a methodology is step A, step B, step C,**
17:58:51 **5 step D. There is no methodology for determining**
17:58:55 **6 tensile strength, much less an undefined high tensile**
17:58:58 **7 strength.**
17:58:59 **8** **Q.** Is there anything in the published
17:59:00 **9** literature that allows a scientist to determine the
17:59:03 **10** tensile strength and flexibility of a putative
17:59:07 **11** asbestos fiber?
17:59:07 **12** **A. Not individual fibers, no. There's plenty**
17:59:10 **13 of literature that geologists walking around in a**
17:59:15 **14 mine can make a grab sample, usually 10 to**
17:59:18 **15 15 centimeters long, they'll tape it to paper, it's**
17:59:21 **16 very flexible at that, and then they'll put it in an**
17:59:24 **17 Instron and pull it, and then they can determine the**
17:59:27 **18 tensile strength.**
17:59:28 **19** **Q.** Have you ever heard of -- sorry.
17:59:28 **20** **A. Go ahead. I'm sorry.**
17:59:30 **21** **Q.** Did you ever hear of a PLM scientist
17:59:33 **22** looking at a sample and pushing it down and if it
17:59:36 **23** breaks versus whether it bends, that relates to
17:59:40 **24** tensile strength? Have you ever heard of that?
17:59:41 **25** MR. CIRSCH: Object to form.
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17:59:42 **1** THE WITNESS: No. There's no protocol for
 17:59:45 **2** that.
 17:59:45 **3** MR. CIRSCH: Alex, we probably should
 17:59:47 **4** break any time in the next few minutes, if we
 17:59:50 **5** can.
6 MR. CHACHKES: Yeah, we can take a break,
 18:01:21 **7** that's fine.
 18:01:21 **8** (Recess from 6:01 p.m. to 6:53 p.m.)
 19:15:25 **9** Q. (By Mr. Chachkes) Dr. Longo, your
 19:15:52 **10** analysts reported identifying cleavage fragments in
 19:15:56 **11** many of the samples by ISO PLM; correct?
 19:15:58 **12** A. **Yes.**
 19:15:58 **13** Q. How many anthophyllite cleavage fragments
 19:16:01 **14** did your analysts detect?
 19:16:03 **15** A. **I don't recall them detecting any.**
 19:16:04 **16** Q. How many tremolite cleavage fragments did
 19:16:08 **17** your analysts detect?
 19:16:08 **18** A. **We just determined -- we didn't do a count**
 19:16:11 **19** **of how many cleavage fragments, only that they were**
 19:16:13 **20** **present.**
 19:16:14 **21** Q. Did you produce the data regarding the
 19:16:16 **22** cleavage fragment particles in these samples?
 19:16:20 **23** A. **I produced all the data we have. Some of**
 19:16:22 **24** **the photographs you can see some of the cleavage**
 19:16:26 **25** **fragments, others you can't.**
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19:16:27 **1** Q. Did you quantify identified cleavage
 19:16:32 **2** fragments the way you quantified identified
 19:16:35 **3** asbestiform fibers and bundles?
 19:16:36 **4** A. **No.**
 19:16:37 **5** Q. And you don't report on cleavage fragments
 19:16:41 **6** in your report; correct? I'm sorry, strike that.
 19:16:45 **7** You don't report on the concentration of
 19:16:47 **8** cleavage fragments in your report; correct?
 19:16:49 **9** A. **I do not.**
 19:16:50 **10** Q. Okay. And you did not take that data?
 19:16:54 **11** A. **Other than to note that they were present.**
 19:16:57 **12** Q. Okay. And you cannot state to a
 19:17:00 **13** reasonable degree of scientific certainty what the
 19:17:02 **14** concentration of cleavage fragments in any of these
 19:17:04 **15** samples were; correct?
 19:17:05 **16** A. **We did not quantify the numbers of**
 19:17:09 **17** **cleavage fragments that were observed other than that**
 19:17:12 **18** **they were present.**
 19:17:13 **19** MR. CHACHKES: Okay. Let's look at this
 19:17:15 **20** one.
 19:17:19 **21** All right. We're going to look at a
 19:17:21 **22** sample where the analyst reported both cleavage
 19:17:24 **23** fragments and asbestos by PLM. Let's mark 24.
24 (Defendants' Exhibit 24 was marked for
 19:17:43 **25** identification.)
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19:17:43 **1** Q. (By Mr. Chachkes) So you see at the
 19:17:44 **2** bottom, this is a -- actually, what do you call this
 19:17:50 **3** count sheet here, this sheet, Exhibit 24?
 19:17:53 **4** A. **It's the PLM analysis bench sheet.**
 19:17:56 **5** Q. Okay. So this Exhibit 24, which is your
 19:17:58 **6** PLM analysis bench sheet for a particular sample, you
 19:18:01 **7** see at the bottom that both cleavage fragments and
 19:18:07 **8** asbestos particles were observed?
 19:18:09 **9** A. **Yes.**
 19:18:10 **10** Q. Okay. I see it says -- is it both
 19:18:15 **11** actinolite and tremolite cleavage fragments were
 19:18:18 **12** observed? Am I reading that right?
 19:18:19 **13** A. **Yes.**
 19:18:19 **14** Q. And let's go to -- and this is from your
 19:18:24 **15** report, pages 120 to 128 from your January report,
 19:18:28 **16** the analysis for bottle M68503-010-BL1; do you see
 19:18:37 **17** that?
 19:18:37 **18** A. **Yes.**
 19:18:38 **19** Q. Okay. So let's turn to the picture -- the
 19:18:47 **20** first picture we get to, which is I guess on page 2
 19:18:50 **21** of this document.
 19:18:51 **22** Which are cleavage fragments and which are
 19:18:53 **23** asbestiform, or can you not tell?
 19:18:56 **24** A. **Well the one that we see here that's**
 19:18:58 **25** **measured as 69 micrometers, that is asbestiform. We**
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19:19:03 **1** **have many talc particles, and --**
 19:19:06 **2** Q. How do you know which are the talc
 19:19:10 **3** particles?
 19:19:10 **4** A. **I'm looking at them. Because under**
 19:19:13 **5** **dispersion staining they're usually anywhere from --**
 19:19:17 **6** **depending on the thickness of bluish to a brighter**
 19:19:20 **7** **yellow.**
 19:19:21 **8** **And potentially, one other asbestiform**
 19:19:28 **9** **down in the lower left-hand -- next to a fairly good**
 19:19:35 **10** **size talc particle.**
 19:19:36 **11** Q. It looks like the top of a T --
 19:19:36 **12** A. **Yes --**
 19:19:37 **13** Q. -- on its side?
 19:19:39 **14** A. **-- that's a good description.**
 19:19:41 **15** **And as for cleavage fragments -- and I**
 19:19:44 **16** **would have to be looking in the microscope, but I**
 19:19:46 **17** **would say potentially one.**
 19:19:49 **18** Q. Where?
 19:19:49 **19** A. **There (indicating).**
 19:19:53 **20** Q. So you're pointing to it looks like a
 19:19:56 **21** yellow kernel of corn somewhere center left, and
 19:19:59 **22** there's a very small kind of orangish stain right to
 19:20:03 **23** the right of it; is that what you're looking at?
 19:20:05 **24** A. **That's what I'm saying, potentially one.**
 19:20:08 **25** Q. Okay. What about the next page? Do you
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19:20:14 **1** see any asbestiform particles, any cleavage
 19:20:17 **2** fragments?
 19:20:18 **3 A. Well, we're looking at the exact same**
 19:20:25 **4 material. Now we're in perpendicular dispersion,**
 19:20:29 **5 which you have this color change, so there's no new**
 19:20:33 **6 information here.**
 19:20:35 **7 Q. Okay. And so what you identified in the**
 19:20:37 **8 previous page as a potential cleavage fragment, is**
 19:20:40 **9 that what I see, it's kind of like center, down about**
 19:20:43 **10 halfway, above what looks like a yellow delta.**
 19:20:53 **11 A. Yes.**
 19:20:57 **12 Q. Okay. Looking at the purple page. Tell**
 19:21:15 **13 me when you're there. There's something an arrow is**
 19:21:18 **14 pointing at. What's that?**
 19:21:19 **15 A. That's the same structure we've been**
 19:21:22 **16 looking at. It's at a higher magnification, 200**
 19:21:25 **17 times.**
 19:21:25 **18 Q. Okay.**
 19:21:25 **19 A. So that's the actinolite/tremolite**
 19:21:30 **20 asbestos bundle, and the resolution on the elongation**
 19:21:35 **21 with the gypsum filter, if it's 530 nanometers,**
 19:21:42 **22 you're not resolving any of these very small**
 19:21:45 **23 particulates.**
 19:21:45 **24 Q. So you called it a bundle. Where are the**
 19:21:47 **25 fibers?**
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19:21:48 **1 A. Well, you can't see it there, but you can**
 19:21:51 **2 see the fibers in the dispersion staining on both the**
 19:22:03 **3 perpendicular and the parallel orientations.**
 19:22:06 **4 Q. Those are the first two pages we looked**
 19:22:09 **5 at?**
 19:22:09 **6 A. Yes.**
 19:22:09 **7 Q. Okay. Explain how you selected the**
 19:22:17 **8 refractive index liquid when you conducted -- when**
 19:22:21 **9 you're conducting analysis.**
 19:22:23 **10 A. The 1.605 is a common refractive indices**
 19:22:27 **11 liquid that you can use. You can use 1.605, you can**
 19:22:31 **12 use a 1.63 or a 1.64; but that's, in my opinion, the**
 19:22:38 **13 most common refractive indices liquid for amphiboles.**
 19:22:43 **14 Q. When you call it the most common, is**
 19:22:46 **15 that -- can I find that in the peer-reviewed**
 19:22:48 **16 literature?**
 19:22:48 **17 A. Let's see. Would it say the most common?**
 19:22:58 **18 I don't know. But -- you know, I won't waste time,**
 19:23:02 **19 but in the one they'll talk about the different**
 19:23:09 **20 refractive indices liquids. You can use others.**
 19:23:11 **21 Q. And you're looking at Exhibit 4, which is**
 19:23:12 **22 the 22262 part 1?**
 19:23:14 **23 A. Yes.**
 19:23:14 **24 Q. I'm looking at page 15 where it says,**
 19:23:31 **25 under 7.1.4.1, RI liquids in the range of 1.605 to**
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19:23:39 **1 1.660 are required at intervals of 0005.**
 19:23:43 **2 Do you see that?**
 19:23:45 **3 A. Yes.**
 19:23:50 **4 Q. Okay. Is it what's in 7.1.4.1 that led**
 19:23:57 **5 you to 1.605 as the RI liquid?**
 19:24:01 **6 A. Yes and no. Yes, it states that 1.605.**
 19:24:07 **7 But, no, it's the common refractive indices liquid**
 19:24:11 **8 that we use that's in the R-93, so it's one of the**
 19:24:14 **9 common refractive indices liquids for this type of**
 19:24:17 **10 analysis.**
 19:24:18 **11 Q. Okay. Did you use liquids at intervals of**
 19:24:23 **12 005?**
 19:24:24 **13 A. No. We just use 1.605.**
 19:24:32 **14 Q. Can RI liquid 1.605 determine whether a**
 19:24:38 **15 particle is anthophyllite?**
 19:24:39 **16 A. Yes.**
 19:24:40 **17 Q. Can it be used to determine whether a**
 19:24:43 **18 particle is talc?**
 19:24:44 **19 A. Yes. You can determine the difference**
 19:24:49 **20 between the talc and the anthophyllite and the**
 19:24:53 **21 tremolite in 1.605.**
 19:24:55 **22 You can use 1.55 if you want further**
 19:24:59 **23 identification.**
 19:25:00 **24 Q. What color would anthophyllite appear as**
 19:25:03 **25 using the RI liquid 1.605?**
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19:25:06 **1 A. Under dispersion staining it's typically a**
 19:25:10 **2 lightish gold versus a darker, yellowish gold on the**
 19:25:17 **3 tremolite, as I recall correctly.**
 19:25:19 **4 Q. What about talc, what color does that show**
 19:25:22 **5 up?**
 19:25:22 **6 A. Anywhere from very bright, like as can be**
 19:25:30 **7 seen in this, to, depending on the thickness, to a**
 19:25:34 **8 bluish kind of grayish color.**
 19:25:37 **9 Q. Okay. If the talc folds up on itself,**
 19:25:40 **10 will it appear as a different color, that part that's**
 19:25:43 **11 folded up on itself?**
 19:25:44 **12 A. We've never seen that, but I don't believe**
 19:25:46 **13 so, no.**
 19:25:47 **14 Q. Okay. Does the peer-reviewed literature**
 19:25:53 **15 tell you what the colors will be for RI 1.605 for**
 19:25:57 **16 anthophyllite talc and tremolite?**
 19:25:58 **17 A. Yes. Depending on what type of microscope**
 19:26:04 **18 you have, if it's got an angular condenser lens and**
 19:26:09 **19 what the temperature is, you can go through the**
 19:26:11 **20 wavelengths of light and colors and pick out the**
 19:26:15 **21 refractive indices for these particular types of**
 19:26:18 **22 amphiboles.**
 19:26:18 **23 Q. Okay. Would you expect sometimes using RI**
 19:26:30 **24 liquid 1.605 for anthophyllite to turn up as a color**
 19:26:32 **25 that's completely different from lightish gold?**
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19:26:35 **1 A. Sometimes that happens, depending on the**
 19:26:39 **2 thickness of the bundle, because of the way it's**
 19:26:43 **3 transmitted through the light, so then you have to**
 19:26:46 **4 look more around the edges of the bundle to get the**
 19:26:48 **5 appropriate colors.**
 19:26:49 **6 But I've seen it go from everything from a**
 19:26:51 **7 goldish yellow to a reddish to a blue when you get**
 19:26:54 **8 these really thick, multifiber bundles.**
 19:26:57 **9 Q. And where can I find in the peer-reviewed**
 19:27:01 **10 literature this range of colors and what they**
 19:27:03 **11 correspond to under RI 1.605?**
 19:27:06 **12 A. The Su article. Or any article that tells**
 19:27:12 **13 you how to do polarized light microscopy. You can go**
 19:27:16 **14 back to the early McCrone particle analysis.**
 19:27:31 **15 MR. CHACHKES: Okay. Let's mark as the**
 19:27:32 **16 next Exhibit 25.**
 19:27:59 **17 (Defendants' Exhibit 25 was marked for**
 19:27:59 **18 identification.)**
 19:28:03 **19 Q. (By Mr. Chachkes) Okay. In your expert**
 19:28:06 **20 opinion, is -- this is a talc particle and an**
 19:28:08 **21 anthophyllite particle?**
 19:28:11 **22 A. Well, you have one -- two talc particles**
 19:28:15 **23 that you can see for sure. This is out of focus.**
 19:28:20 **24 And then you have the anthophyllite asbestos bundle.**
 19:28:20 **25 Q. So the -- I'm focusing on the talc**
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19:28:25 **1 particle in the center. It's your opinion that what**
 19:28:28 **2 happened is there's an anthophyllite fiber that has**
 19:28:32 **3 the exact length and is perfectly flush with the talc**
 19:28:37 **4 particle that happened to match perfectly that edge?**
 19:28:41 **5 MR. CIRSCH: Object to form.**
 19:28:42 **6 THE WITNESS: Yes.**
 19:28:48 **7 Q. (By Mr. Chachkes) Okay. And is there a**
 19:28:49 **8 chance that that actually is just the rolled up edge**
 19:28:51 **9 of a talc?**
 19:28:52 **10 A. No.**
 19:28:52 **11 Q. And why do you say no?**
 19:28:53 **12 A. Because you have some rolling here a**
 19:28:56 **13 little bit. But it doesn't matter if it rolls up;**
 19:29:00 **14 you're not going to get the same color like that.**
 19:29:02 **15 Q. And you said that you can get a range of**
 19:29:10 **16 colors for anthophyllite, including red and blue.**
 19:29:13 **17 Does the same apply for talc?**
 19:29:15 **18 A. No, that's not what I said. I said if you**
 19:29:18 **19 have a very thick bundle, you're going to have the**
 19:29:20 **20 range of colors. And it happens with the**
 19:29:22 **21 actinolite/tremolite also, but you do get the primary**
 19:29:25 **22 colors. Once it gets to a certain thickness,**
 19:29:29 **23 transmitting through the light is different. So we**
 19:29:33 **24 have some examples of those somewhere where you can**
 19:29:35 **25 get the appropriate colors. That's not rolled up**
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19:29:37 **1 talc.**
 19:29:38 **2 Q. Okay. And do you have a reference in**
 19:29:44 **3 mind, peer-reviewed reference, that shows you what a**
 19:29:47 **4 rolled up talc looks like in a PLM?**
 19:29:49 **5 A. I've never seen a peer-reviewed reference**
 19:29:53 **6 that shows what that looks like. You know, I'll**
 19:29:56 **7 quote from Walter McCrone himself that he's never**
 19:30:01 **8 seen a rolled up talc particle.**
 19:30:03 **9 Q. And you're citing what paper?**
 19:30:05 **10 A. It's in my report, the reference to it,**
 19:30:09 **11 where he says exactly that he had -- for whatever**
 19:30:12 **12 reason, that I have never seen a rolled up talc**
 19:30:15 **13 particle.**
 19:30:16 **14 Q. Do you know what refractive index liquid**
 19:30:20 **15 it takes to make the distinction between**
 19:30:22 **16 anthophyllite and talc?**
 19:30:24 **17 A. You can use -- this is in 1.605.**
 19:30:30 **18 Q. Okay. Go ahead.**
 19:30:32 **19 A. You can use that. But if you're going to**
 19:30:35 **20 look just at the talc alone, you use the 1.5 fiber**
 19:30:40 **21 refractive indices liquid.**
 19:30:43 **22 Q. Okay.**
 19:30:43 **23 A. But you can't kind of mix and match here.**
 19:30:47 **24 If you're going to -- and we do that sometimes when**
 19:30:48 **25 there's no -- if there's no asbestiform bundles in**
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19:30:52 **1 it, you'll see in some of our count sheets in there**
 19:30:56 **2 that it will have 1.55.**
 19:30:57 **3 Q. But it is your opinion that you can use**
 19:31:00 **4 1.605 to distinguish anthophyllite and talc?**
 19:31:04 **5 A. Correct.**
 19:31:05 **6 Q. Okay. Is there additional data concerning**
 19:31:22 **7 the samples upon which you reported ISO PLM, as in a**
 19:31:26 **8 file somewhere in your laboratory but not printed out**
 19:31:28 **9 or produced?**
 19:31:29 **10 A. I don't believe so. I tried to produce**
 19:31:31 **11 everything that we took.**
 19:31:32 **12 Q. Okay. Was there any data generated in**
 19:31:34 **13 connection with ISO PLM analysis in this case that**
 19:31:36 **14 was either thrown away or deleted?**
 19:31:39 **15 A. No.**
 19:31:39 **16 Q. What are the differences, if any, between**
 19:31:45 **17 how your analysts employed the Blount method and how**
 19:31:50 **18 it is actually written in the 1991 article?**
 19:31:54 **19 A. The only difference is it's unable to**
 19:31:59 **20 really interpret how she counts the particulates or**
 19:32:03 **21 if she is counting the fibers per milligram of**
 19:32:06 **22 material. We've looked at that.**
 19:32:09 **23 So she gives it in numbers of fibers or**
 19:32:12 **24 numbers of bundles per milligram, a number count,**
 19:32:15 **25 which is the same thing we do, of course, in the TEM,**
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19:32:19 **1 where we just follow the procedure here for the ISO**
 19:32:21 **2 22262-1 for an estimated weight percent.**
 19:32:26 **3 Q.** Okay. But otherwise, you followed the
 19:32:28 **4 1991 Blount method to the letter?**
 19:32:31 **5 A. Pretty much.**
 19:32:32 **6 Q.** Following the Blount concentration, your
 19:32:37 **7 analysts conducted PLM pursuant to ISO 22262-1 PLM**
 19:32:41 **8 method; right?**
 19:32:43 **9 A. That's correct.**
 19:32:43 **10 Q.** Blount did not use that 22262-1 PLM;
 19:32:49 **11 correct?**
 19:32:53 **12 A. No, she used a fiber count method so that**
 19:32:57 **13 if you look at her data, I think she has anywhere for**
 19:33:02 **14 that sample I, which is the Johnson & Johnson Vermont**
 19:33:05 **15 sample, 1989-1990, she finds in the range of about**
 19:33:11 **16 100 to almost 235 milligrams -- fiber/bundles per**
 19:33:14 **17 milligram. So if you multiply that by 1,000 she's**
 19:33:18 **18 finding the ranges of concentrations at the higher**
 19:33:20 **19 end that we are.**
 19:33:23 **20 Q.** And --
 19:33:27 **21 A. So we followed the counting rules for**
 19:33:32 **22 estimating weight percent. She did what we do into**
 19:33:35 **23 the TEM and did a number count per milligram of talc.**
 19:33:38 **24 Q.** Dr. Blount's paper includes a particle
 19:33:41 **25 size distribution analysis; correct?**
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19:33:39 **1 A. Particle size distribution analysis for**
 19:33:41 **2 the length and size of the asbestos -- tremolite**
 19:33:45 **3 asbestos she was finding in the PLM, yes.**
 19:33:47 **4 Q.** And she plotted the aspect ratios of the
 19:33:50 **5 particles she viewed by PLM?**
 19:33:53 **6 A. The fibrous asbestos, yes, she did.**
 19:33:55 **7 Q.** She did this because asbestos has a
 19:33:57 **8 characteristic distribution?**
 19:34:00 **9 A. Milled tremolite has a characteristic**
 19:34:04 **10 distribution, yes.**
 19:34:07 **11 Q.** Okay. And the nonasbestiform version of
 19:34:09 **12 the same amphibole has a different characteristic**
 19:34:13 **13 distribution?**
 19:34:16 **14 A. Yes, it does.**
 19:34:19 **15 Q.** And you did not generate a particle size
 19:34:22 **16 distribution chart like the one in Blount's paper --**
 19:34:25 **17 the ones in Blount's paper in your report?**
 19:34:28 **18 A. Not for the MDL samples, no. We did for**
 19:34:31 **19 the original analysis so that we could compare it to**
 19:34:34 **20 the NIST tremolite asbestos standard, to Blount's**
 19:34:37 **21 particle size, as well as the Campbell particle size.**
 19:34:40 **22 Q.** You included a table with average particle
 19:34:43 **23 size that your analysts recorded by TEM, however,**
 19:34:46 **24 though; right?**
 19:34:49 **25 A. Correct.**
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19:34:47 **1 Q.** Dr. Blount included particles in her
 19:34:50 **2 particle size distribution that were below the 3-to-1**
 19:34:53 **3 aspect ratio; correct?**
 19:34:56 **4 A. That's correct.**
 19:34:59 **5 Q.** Do you have any other opinions regarding
 19:35:02 **6 Dr. Blount's 1990 or 1991 papers in this case beyond**
 19:35:05 **7 those expressed in your report and that we just**
 19:35:08 **8 discussed?**
 19:35:11 **9 A. No.**
 19:35:14 **10 Q.** Is additional data concerning the samples
 19:35:17 **11 upon which you reported for Blount PLM in a file**
 19:35:20 **12 somewhere in your laboratory but not printed out and**
 19:35:23 **13 produced?**
 19:35:26 **14 A. No. We've produced everything that we**
 19:35:29 **15 generated for the MDL.**
 19:35:32 **16 Q.** Okay. And all data and material
 19:35:35 **17 information generated about your work for the Blount**
 19:35:38 **18 PLM was produced?**
 19:35:41 **19 MS. O'DELL: Object to the form.**
 19:35:44 **20 THE WITNESS: As far as I know, everything**
 19:35:47 **21 was produced for all the data we collected for**
 19:35:50 **22 the MDL samples.**
 19:35:53 **23 Q.** (By Mr. Chachkes) Okay. And I think I
 19:35:56 **24 already know the answer, but I'm going to ask it.**
 19:35:59 **25 And any of the data you generated for your Blount PLM**
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19:35:40 **1 analysis, was any of it thrown away or deleted?**
 19:35:43 **2 A. No. We have many negatives, we have many**
 19:35:46 **3 positives, so we just reported what we saw.**
 19:35:49 **4 Q.** In your report at page 8 you state that
 19:35:52 **5 you found fibrous talc in 98 percent of the Italian**
 19:35:55 **6 and Vermont talc samples by ISO 22262-1; correct?**
 19:35:58 **7 A. That's correct.**
 19:36:01 **8 Q.** What's your definition of fibrous talc?
 19:36:04 **9 A. Has greater than .5 micrometers in length,**
 19:36:07 **10 has parallel sides, and it has at least 5-to-1 aspect**
 19:36:10 **11 ratio.**
 19:36:13 **12 Q.** Is there a scientific consensus that there
 19:36:16 **13 is such a thing as fibrous talc?**
 19:36:19 **14 MR. CIRSCH: Object to form.**
 19:36:22 **15 THE WITNESS: I don't believe so.**
 19:36:25 **16 Q.** (By Mr. Chachkes) Are you aware of any
 19:36:28 **17 epidemiologist or doctor who has studied the health**
 19:36:31 **18 effects of fibrous talc?**
 19:36:34 **19 A. I don't testify about health effects of**
 19:36:37 **20 fibrous talc or regulated asbestos, so I don't have**
 19:36:40 **21 any opinions about that one way or the other if**
 19:36:43 **22 anybody has studied it. That's not my area.**
 19:36:46 **23 Q.** You were disclosed for health and
 19:36:49 **24 regulatory definitions of talc; correct?**
 19:36:52 **25 MS. O'DELL: Object to the form.**
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19:36:42 1 THE WITNESS: I don't believe so.
19:36:43 2 Q. (By Mr. Chachkes) Okay. And you're not
19:36:45 3 here to testify about health and regulatory
19:36:48 4 definitions of talc?
19:36:49 5 A. I'm not testifying that fibrous talc has
19:36:52 6 any impact on the human body whatsoever.
19:36:55 7 Q. Are you aware of any regulatory
19:36:57 8 definitions of fibrous talc?
19:37:00 9 A. Fibrous talc for the protocols that we
19:37:05 10 follow is not deemed a regulated asbestos fiber. We
19:37:10 11 just follow the same counting rules that we do for
19:37:13 12 asbestos to characterize what we're looking at.
19:37:18 13 Q. So ISO 22262, parts 1 through 3, they
19:37:22 14 don't define fibrous talc; correct?
19:37:25 15 A. They define anything that is an elongated
19:37:28 16 structure and fibrous that if you care to write down
19:37:33 17 your findings you could put it in.
19:37:35 18 Q. So they define fibrous talc in that way?
19:37:37 19 A. They define elongated fiber materials that
19:37:42 20 you're going to -- if you wish to count into the TEM,
19:37:46 21 any elongated structure.
19:37:48 22 Q. Okay. And so it's your testimony that ISO
19:37:55 23 22262 was meant as a method to count fibrous talc?
19:38:01 24 MR. CIRSCH: Object to form.
19:38:01 25 THE WITNESS: I didn't say that.

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19:38:02 1 Q. (By Mr. Chachkes) Is it a method to count
19:38:03 2 fibrous talc? Is it meant as such as method?
19:38:06 3 MR. CIRSCH: Object to form.
19:38:07 4 THE WITNESS: I don't know what it was
19:38:08 5 meant for, but it gives you the tools if you
19:38:10 6 wish to do that. They don't restrict what you
19:38:13 7 can or can't count. Nowhere in the method does
19:38:16 8 it say don't count the fibrous talc.
19:38:19 9 Q. (By Mr. Chachkes) And can you identify
19:38:26 10 anywhere where there's a method and a peer-reviewed
19:38:30 11 literature or peer-reviewed publication where it
19:38:34 12 expressly refers to fibrous talc and a method to
19:38:36 13 count fibrous talc?
19:38:38 14 A. All the methods allow you to do that.
19:38:42 15 Q. Yeah, I'm not asking about what methods
19:38:44 16 allow you --
19:38:45 17 A. You interrupted me.
19:38:46 18 Q. Okay.
19:38:46 19 A. It's late.
19:38:47 20 All the methods give you the tools to do
19:38:49 21 that if you wish. No method out there says do not
19:38:52 22 count this particular type of structure. Just like
19:38:55 23 in Blount, where she counted the particulates and
19:38:58 24 tried to get a ratio of how many amphibole asbestos
19:39:01 25 was for every number of particulates. The

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19:39:04 1 information doesn't change because somebody doesn't
19:39:07 2 say one way or the other if you should do it.
19:39:10 3 Q. It's a simple question, if you would
19:39:12 4 answer the question I'm actually asking, which is is
19:39:15 5 there a published or peer-reviewed document that you
19:39:17 6 can point me to that expressly talks about a way to
19:39:21 7 count fibrous talc?
19:39:22 8 MR. CIRSCH: Object to form.
19:39:23 9 Q. (By Mr. Chachkes) Putting aside whether
19:39:25 10 you can use some other method that doesn't say the
19:39:28 11 phrase fibrous talc -- to count fibrous talc, is
19:39:30 12 there something that expressly refers to fibrous talc
19:39:32 13 and a method to count it?
19:39:34 14 MR. CIRSCH: Object to form.
19:39:35 15 THE WITNESS: I'd have to go back and
19:39:37 16 relook. None of the methods say do not count
19:39:39 17 fibrous talc.
19:39:41 18 Q. (By Mr. Chachkes) Sitting here -- okay.
19:39:42 19 MR. CIRSCH: Let him finish.
19:39:44 20 THE WITNESS: None of the methods say do
19:39:46 21 not count fibrous talc.
19:39:47 22 Q. (By Mr. Chachkes) Yes, you said that many
19:39:49 23 times. I'm --
19:39:49 24 MR. CIRSCH: You're interrupting him
19:39:51 25 again. Stop. Stop.

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19:39:52 1 THE WITNESS: Let me start over. I lost
19:39:54 2 my train of thought.
19:39:55 3 None of the methods say do not count
19:39:57 4 fibrous talc. The 7402 -- NIOSH 7402
19:40:01 5 specifically says if it's fibrous talc, count
19:40:05 6 it, in TEM. That's one. And I'll have to --
19:40:08 7 Q. (By Mr. Chachkes) So --
19:40:10 8 MR. CIRSCH: You keep interrupting him.
19:40:12 9 MR. CHACHKES: I'm asking just to save --
19:40:12 10 MS. O'DELL: No, you're interrupting him.
19:40:14 11 MR. CIRSCH: You keep doing it, Alex.
19:40:16 12 THE WITNESS: So that's one.
19:40:17 13 Q. (By Mr. Chachkes) NIOSH?
19:40:18 14 A. NIOSH 7402 TEM method, where you're
19:40:20 15 determining the percentage of asbestos -- regulated
19:40:24 16 asbestos defined by the counting rules versus other
19:40:27 17 things, and it actually has talc in there.
19:40:30 18 Q. Okay. So in there I can look, and it will
19:40:32 19 say here's how you count fibrous talc?
19:40:35 20 A. I don't think they put it that simply.
19:40:38 21 But if you have knowledge about the protocols and
19:40:41 22 read through it, you would understand.
19:40:43 23 Q. Okay. Putting aside whether there are
19:40:46 24 documents that don't expressly say you can't use them
19:40:50 25 for this purpose, is there a document that says this

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19:40:53 **1** is how you count fibrous talc, using the phrase
 19:40:56 **2** fibrous talc?
 19:40:57 **3** **A. They all say it because they say this is**
 19:40:59 **4 how you define a fiber. Then how you identify what**
 19:41:03 **5 that fiber is, you can make that decision. But every**
 19:41:06 **6 one of these TEM protocols say this is the definition**
 19:41:09 **7 of a fiber.**
 19:41:10 **8** **Q.** Putting aside protocols and publications
 19:41:16 **9** that talk about fibers generally, and putting aside
 19:41:18 **10** your continued insistence on talking about things
 19:41:21 **11** that don't say something, is there something that
 19:41:23 **12** actually says this is how you count fibrous talc,
 19:41:27 **13** using the phrase fibrous talc?
 19:41:29 **14** MR. CIRSCH: Object to form.
 19:41:33 **15** THE WITNESS: It is my opinion that they
 19:41:34 **16** all give you the tools to count fibrous talc.
 19:41:37 **17** Do they actually say what every mineral --
 19:41:39 **18** elongated particle mineral is that you should or
 19:41:42 **19** should not count? I'd have to go back and
 19:41:44 **20** check.
 19:41:45 **21** I'm going to give you the same answer for
 19:41:47 **22** the same question. They all provide you the
 19:41:49 **23** tools or the counting procedures to count
 19:41:53 **24** whatever elongated particle you want and
 19:41:56 **25** identify it.

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19:42:26 **1** MS. O'DELL: CMO 11, as you know, Alex,
 19:42:32 **2** requires you to --
 19:42:34 **3** MR. CHACHKES: I'm sorry, are you
 19:42:35 **4** testifying about a document?
 19:42:36 **5** MS. O'DELL: I'm telling you what the
 19:42:37 **6** order says.
 19:42:38 **7** MR. CHACHKES: Oh, okay. I'm sorry.
 19:42:39 **8** MS. O'DELL: You may not be aware of the
 19:42:42 **10** order since you've not appeared in the MDL, but
 19:42:42 **11** it says to --
 19:42:42 **12** MR. CHACHKES: Actually --
 19:42:44 **13** MS. O'DELL: -- treat the witness with
 19:42:46 **14** civility and respect.
 19:42:47 **15** He's answered your question, and you
 19:42:49 **16** should stop badgering him.
 19:42:51 **17** MR. CHACHKES: Okay. Your objection's
 19:42:52 **18** been made.
 19:42:53 **19** **Q.** (By Mr. Chachkes) Are fibrous talc and
 19:42:55 **20** **A. No.**
 19:42:59 **21** **Q.** In your report at page 30 you write that
 19:43:03 **22** others have reported that fibrous talc is a
 19:43:06 **23** geological metamorphic transformation of
 19:43:09 **24** anthophyllite to fibrous talc?
 19:43:11 **25** **A. Yes.**

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19:41:56 **1** **Q.** (By Mr. Chachkes) So sitting here today,
 19:41:57 **2** you can't tell me a counting protocol that expressly
 19:42:01 **3** mentions this is how you count, mentioning the phrase
 19:42:04 **4** fibrous talc?
 19:42:06 **5** MR. CIRSCH: Object to form. He's
 19:42:07 **6** answered the question. I instruct him not to
 19:42:09 **7** answer any further.
 19:42:11 **8** MR. CHACHKES: You're instructing him not
 19:42:12 **9** to answer?
 19:42:13 **10** MR. CIRSCH: He answered the question. I
 19:42:13 **11** mean, you're badgering him now with the same
 19:42:15 **12** question over and over again.
 19:42:17 **13** MR. CHACHKES: I'm asking a different
 19:42:17 **14** question.
 19:42:17 **15** MS. O'DELL: Alex, I'm sure you're
 19:42:19 **16** aware --
 19:42:20 **17** MR. CHACHKES: Who's objecting here?
 19:42:21 **18** MS. O'DELL: I'm objecting right here, and
 19:42:22 **19** I'm sure you're aware --
 19:42:24 **20** MR. CHACHKES: Okay. Can we just keep it
 19:42:24 **21** to one person? It's a much more controlled
 19:42:25 **22** environment when we do that.
 19:42:25 **23** MS. O'DELL: Let me -- don't interrupt me.
 19:42:26 **24** MR. CHACHKES: Okay. Wait. Which Lee is
 19:42:26 **25** objecting?

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19:43:12 **1** **Q.** Okay. And then you cite a couple of
 19:43:15 **2** things. There's an MVA report -- two MVA reports,
 19:43:19 **3** right? You can go to page 30, footnotes 42, 43.
 19:43:28 **4** **A. It should be reference 30, Virta, The**
 19:43:44 **5 Phase Relationship of Talc and Amphiboles in a**
 19:43:47 **6 Fibrous Talc Sample, Bureau of Mines report is one.**
 19:43:50 **7 Veblen, 29, New Bio -- it's late -- I**
 19:43:56 **8 can't even pronounce it -- Biopyriboles, Chester,**
 19:44:00 **9 Vermont, talks about the polymorph transformation.**
 19:44:06 **10 That's how fibrous talc is generated --**
 19:44:08 **11** **Q.** Okay.
 19:44:11 **12** **A. -- is the -- during way back when, during**
 19:44:12 **13 pressure and temperature, when you had the liquid**
 19:44:16 **14 rock and -- depending on the minerals. Those are two**
 19:44:19 **15 references and there's others. I didn't put all of**
 19:44:19 **16 them in there.**
 19:44:19 **17** **Q.** Okay. Let's talk about two references you
 19:44:21 **18** did put in. You put in two references to MVA
 19:44:24 **19** reports, footnotes 42 and 43; correct?
 19:44:55 **20** Am I correct that 42 and 43 --
 19:44:58 **21** **A. You are correct.**
 19:44:58 **22** **Q.** Okay. And those are reports prepared for
 19:45:01 **23** plaintiffs in talc litigation?
 19:45:05 **24** MR. CIRSCH: Object to form.
 19:45:06 **25** THE WITNESS: That's my understanding.

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19:45:06 **1** Q. (By Mr. Chachkes) Okay. In your footnote
 19:45:09 **2** 42, you have the date of the MVA report as 2018, but
 19:45:14 **3** it was actually from 2017; correct?
 19:45:18 **4** A. **That's correct.**
 19:45:18 **5** Q. These MVA reports you cite in footnotes 42
 19:45:22 **6** and 43, those were not published; correct?
 19:45:24 **7** A. **No, sir.**
 19:45:25 **8** Q. And they're not peer-reviewed?
 19:45:27 **9** A. **As far as I know, they haven't been**
 19:45:30 **10 published.**
 19:45:30 **11** Q. And they're not peer-reviewed, are they?
 19:45:33 **12** A. **Well, if you're talking about**
 19:45:34 **13 peer-reviewed in a publication, no.**
 19:45:36 **14** Q. Okay. Is there another form of peer
 19:45:41 **15** review you're aware of?
 19:45:42 **16** A. **Well, any time anybody looks over a report**
 19:45:46 **17 and writes comments about it, it's peer-reviewed.**
 19:45:49 **18** Q. So would you call your expert report in
 19:45:51 **19** this case peer-reviewed?
 19:45:53 **20** A. **No, sir.**
 19:45:55 **21** Q. Didn't Rigler look over it?
 19:45:58 **22** A. **I'm talking about peer review where people**
 19:46:00 **23 are looking for the scientific validity of it. It's**
 19:46:05 **24 not -- as far as I know, the MVA talc analysis has**
 19:46:09 **25 not been published.**
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19:46:10 **1** Q. Okay. And as far as you know, you don't
 19:46:13 **2** have any information that it's been peer-reviewed?
 19:46:15 **3** MR. CIRSCH: Object to form.
 19:46:16 **4** THE WITNESS: You know, I'll give you
 19:46:17 **5** that. That's correct.
 19:46:17 **6** Q. (By Mr. Chachkes) What is MVA? What does
 19:46:21 **7** it stand for?
 19:46:22 **8** A. **Millette, Vander Wood & Associates.**
 19:46:24 **9** Q. And both of these reports were authored by
 19:46:27 **10** Dr. Steve Compton?
 19:46:28 **11** A. **Yes, sir.**
 19:46:28 **12** Q. And you've testified in cases with
 19:46:30 **13** Dr. Compton before; correct?
 19:46:31 **14** A. **I understand he's been in the same cases**
 19:46:33 **15 as me.**
 19:46:34 **16** Q. On plaintiffs' side?
 19:46:35 **17** MR. CIRSCH: Object to form.
 19:46:36 **18** THE WITNESS: Yes, sir.
 19:46:36 **19** Q. (By Mr. Chachkes) Okay. He's also an
 19:46:38 **20** expert for plaintiffs' attorneys in asbestos
 19:46:40 **21** litigation?
 19:46:41 **22** A. **He has.**
 19:46:41 **23** Q. Describe how your analysts utilized
 19:46:49 **24** process blanks in their analysis.
 19:46:51 **25** A. **Every set of samples that are prepared, a**
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19:46:56 **1** process blank is prepared along with it so that
 19:46:59 **2** everything is done exactly the same except no talc.
 19:47:03 **3** And then those samples are run through the whole
 19:47:07 **4** preparation process, and then they are analyzed in
 19:47:09 **5** the same manner as the talc samples.
 19:47:13 **6** Q. Do your analysts run a process blank with
 19:47:16 **7** every single individual sample?
 19:47:17 **8** A. **No. Every set of samples that are all**
 19:47:20 **9** prepared at the same time.
 19:47:21 **10** Q. Okay. And so for the MDL samples, what
 19:47:24 **11** would constitute a set in that context?
 19:47:28 **12** A. **Let me look, because Rigler can talk about**
 19:47:48 **13** it more tomorrow.
 19:48:02 **14** So we have a number of blanks, and
 19:48:06 **15** typically we have a chart that shows which process
 19:48:12 **16** blanks go to which set of samples.
 19:48:22 **17** I'll see if Rigler can bring that
 19:48:23 **18** tomorrow.
 19:48:30 **19** I don't have that information. Typically
 19:48:32 **20** we give that.
 19:48:32 **21** Q. Why do you say Rigler can bring it
 19:48:36 **22** tomorrow? Was he involved in that process?
 19:48:38 **23** A. **Well, he was involved putting this report**
 19:48:40 **24** together. And since he's coming tomorrow, maybe he
 19:48:43 **25** can get in early enough to say which set of samples
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19:48:46 **1** were analyzed for each process blank.
 19:48:49 **2** Q. Sitting here today, even with the report
 19:48:51 **3** before you, you can't tell me that?
 19:48:53 **4** A. **No, I don't see the chart that we have**
 19:49:01 **5** prepared in the past.
 19:49:03 **6** Q. Do your analysts run a process blank with
 19:49:06 **7** every sample analyzed by PLM?
 19:49:08 **8** A. **Well, you don't have anything that you're**
 19:49:12 **9** generating. A process blank would literally be
 19:49:17 **10** putting the glass slide on the polarized light
 19:49:20 **11** microscope and looking at it because you're not
 19:49:20 **12** filtering anything, you're not using reagents, so
 19:49:24 **13** there's no such thing as a process blank in polarized
 19:49:27 **14** light microscopy.
 19:49:27 **15** Q. Okay. Does the ISO method provide a
 19:49:35 **16** process blank protocol?
 19:49:38 **17** A. **I don't think so.**
 19:49:39 **18** Q. Do you follow a process blank procedure
 19:49:42 **19** pursuant to your lab's standard protocols?
 19:49:44 **20** A. **Yes.**
 19:49:44 **21** Q. Is that written down somewhere?
 19:49:48 **22** A. **I believe so.**
 19:49:49 **23** Q. All right. We would request that be
 19:49:52 **24** produced.
 19:49:52 **25** Turning back to your TEM process blanks,
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19:49:55 **1** in your January 2019 report you write that, The
19:49:58 **2** process laboratory blanks were prepared in the exact
19:50:02 **3** manner as the talc samples but without any talc
19:50:04 **4** material.
19:50:05 **5** Does that sound familiar?
19:50:06 **6** **A. It does.**
19:50:06 **7** **Q. Okay.**
19:50:07 **8** **A. I wrote it.**
19:50:08 **9** **Q. Was the first step in your process blank**
19:50:10 **10** **protocol centrifuging a centrifuge tube with just**
19:50:15 **11** **heavy liquid and no talc in it?**
19:50:17 **12** **A. Correct.**
19:50:17 **13** **Q. The first step of your process blank**
19:50:19 **14** **protocol test tests both -- does it test both the**
19:50:25 **15** **centrifuge tube and the heavy liquid for**
19:50:27 **16** **contamination?**
19:50:28 **17** **A. Well, since it's in the centrifuge tube,**
19:50:31 **18** **whatever it's touched would be -- you would be**
19:50:33 **19** **measuring that potential for contamination.**
19:50:36 **20** **Q. It follows that your process blank**
19:50:39 **21** **protocol did not include the portion of your method**
19:50:41 **22** **before centrifugation where you transferred the**
19:50:44 **23** **samples to a balance to be weighed?**
19:50:46 **24** **A. Since we're putting no talc in it, that's**
19:50:49 **25** **correct.**
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19:50:49 **1** **Q. If there was a contamination on the scale,**
19:50:52 **2** **that would not be accounted for in the process blank**
19:50:54 **3** **protocol; correct?**
19:51:00 **4** **A. If. Well, there's no evidence that**
19:51:04 **5** **there's an if in the scale. It's not just taken out**
19:51:09 **6** **and poured onto the scale. You use weigh paper.**
19:51:13 **7** **They're very careful about that.**
19:51:16 **8** **But there is -- so there's no**
19:51:19 **9** **contamination from the scale.**
19:51:20 **10** **Q. But it's fair to say the process blank**
19:51:23 **11** **protocol does not account for potential contamination**
19:51:25 **12** **on the scale, putting aside whether there's**
19:51:27 **13** **contamination or not?**
19:51:28 **14** **A. The process blank is everything that is**
19:51:30 **15** **touched: the liquid, the filtration, the filter, the**
19:51:37 **16** **centrifuge tube, the additional material, the**
19:51:46 **17** **apparatus that holds the filter, all that is checked.**
19:51:50 **18** **Q. My question's about what wasn't checked.**
19:51:53 **19** **Was the scale checked with the process blank**
19:51:55 **20** **protocol?**
19:51:56 **21** **A. You can't check the scale.**
19:51:57 **22** **Q. Okay. When you ran your process blanks,**
19:52:00 **23** **that process did not involve scraping samples out of**
19:52:03 **24** **the MCT tubes; right?**
19:52:09 **25** **A. Scraping samples out of the MC tube -- the**
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19:52:19 **1** **tube is cut with a guillotine. The centrifuge tube**
19:52:24 **2** **is cut with a guillotine. There's no scraping for**
19:52:26 **3** **the TEM.**
19:52:27 **4** **Q. When you ran your process blanks, the**
19:52:30 **5** **process did not involve taking material out of the**
19:52:33 **6** **MCT tubes; right?**
19:52:35 **7** **A. Sure, it did. It's the same way we take**
19:52:38 **8** **the material out when we do the TEM analysis for the**
19:52:41 **9** **process blanks. The end of the tube is cut where the**
19:52:45 **10** **heavy materials -- the heavy minerals are, and then**
19:52:49 **11** **it's run the exact same way.**
19:52:51 **12** **Q. Okay. So the process blank protocol did**
19:52:52 **13** **include the portion of your method where you scraped**
19:52:54 **14** **the centrifuge from the tube which is --**
19:52:56 **15** **A. It's not scraped.**
19:52:57 **16** **MR. CIRSCH: Object to form.**
19:52:58 **17** **THE WITNESS: There's no scraping.**
19:53:00 **18** **Q. (By Mr. Chachkes) Okay.**
19:53:00 **19** **A. The tip is cut with a guillotine after**
19:53:02 **20** **it's been flash frozen in liquid nitrogen, and then**
19:53:07 **21** **that whole tip is put into a solution and then**
19:53:08 **22** **washed. There's no scraping.**
19:53:09 **23** **Q. I'll pick a more palatable verb.**
19:53:13 **24** **It follows that -- so you're saying your**
19:53:14 **25** **process blank protocol included the portion of your**
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19:53:15 **1** **method where you removed from the centrifuge the**
19:53:22 **2** **material with a spatula?**
19:53:27 **3** **A. There's no removing from the centrifuge**
19:53:29 **4** **tube after the spin-down with a spatula.**
19:53:34 **5** **Q. Do you just leave the material in the**
19:53:36 **6** **centrifuge?**
19:53:36 **7** **A. We cut the tip of -- the very bottom of**
19:53:38 **8** **the centrifuge tube off for TEM analysis, and then**
19:53:41 **9** **that whole tip is transferred inside and outside into**
19:53:44 **10** **the solution that is then going to be filtered where**
19:53:47 **11** **you dilute the heavy liquid density material, as we**
19:53:50 **12** **do with the TEM analysis.**
19:53:53 **13** **Q. What percentage of MAS's work is testing**
19:53:55 **14** **talc for asbestos?**
19:53:56 **15** **A. A lot.**
19:54:02 **16** **Q. Over 80 percent?**
19:54:03 **17** **A. I would say right now that our revenue is**
19:54:06 **18** **approximately 70 percent of talc analysis and**
19:54:09 **19** **everything associated with it.**
19:54:10 **20** **Q. Is the remaining --**
19:54:12 **21** **MR. CIRSCH: I don't know if he was --**
19:54:13 **22** **were you done?**
19:54:13 **23** **THE WITNESS: Yeah.**
19:54:13 **24** **Q. (By Mr. Chachkes) Is the remaining**
19:54:15 **25** **percentage primarily testing asbestos?**
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19:54:19 **1 A. Very small percentage of that. Other**
 19:54:24 **2 stuff that we do.**
 19:54:24 **3 Q. I'm sorry.**
 19:54:26 **4 A. Other nonlitigation projects that we do.**
 19:54:29 **5 Q. Of the 30 percent of your work that isn't**
 19:54:33 **6 testing talc for asbestos, is that -- what's that**
 19:54:37 **7 30 percent? What are you testing for?**
 19:54:38 **8 A. Well, we do -- like today, I mean, the**
 19:54:46 **9 analysts have around 100 regular, everyday PLM. It's**
 19:54:49 **10 testing for asbestos but not litigation related.**
 19:54:51 **11 Q. Okay. My question didn't really relate to**
 19:54:54 **12 litigation related or not.**
 19:54:56 **13 Of the percentage of your work that's not**
 19:54:57 **14 related to testing talc for asbestos, which is in the**
 19:55:01 **15 range of 30 percent, is it primarily testing other**
 19:55:03 **16 things for asbestos? Strike that. That was a**
 19:55:08 **17 terrible question.**
 19:55:08 **18 For the 30 percent of MAS's work that is**
 19:55:13 **19 not testing talc for asbestos, is that remainder**
 19:55:17 **20 primarily testing for asbestos in other materials or**
 19:55:21 **21 testing asbestos itself?**
 19:55:22 **22 A. Well, let me back up. All our litigation**
 19:55:24 **23 work is approximately 70 percent. I would say talc**
 19:55:29 **24 is approximately, of that 70 percent, maybe 35,**
 19:55:33 **25 40 percent.**
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19:55:35 **1 And then the other portion of that**
 19:55:38 **2 70 percent would be other litigation, other asbestos**
 19:55:41 **3 testing, non-talc work. And then we have 30 or**
 19:55:45 **4 35 percent nonasbestos work.**
 19:55:48 **5 Can we go off the record for a minute?**
 19:55:50 **6 MR. CHACHKES: Sure.**
 19:55:50 **7 (Off the record.)**
 19:56:09 **8 (Recess from 7:56 p.m. to 7:58 p.m.)**
 19:58:45 **9 Q. (By Mr. Chachkes) What was the**
 19:59:03 **10 approximate dates when MAS tested the samples that**
 19:59:05 **11 are discussed in your January 2019 report, from**
 19:59:09 **12 approximately what date to what date?**
 19:59:11 **13 A. You can look through the chain of**
 19:59:12 **14 custodies or look through the -- but I think it was**
 19:59:17 **15 like November, December, October, maybe.**
 19:59:21 **16 And I want to circle back for a second**
 19:59:26 **17 just to clarify. I misspoke earlier. The 70 percent**
 19:59:29 **18 is not talc litigation or talc testing. It's**
 19:59:33 **19 approximately 30, 35 percent of what we do. The**
 19:59:36 **20 remaining 30 percent is nonlitigation work. So I**
 19:59:41 **21 know I misspoke earlier.**
 19:59:42 **22 Q. Okay. Just to make sure the record's**
 19:59:46 **23 clear, so you're saying about 70 percent of your work**
 19:59:48 **24 is litigation related, about 30 is not?**
 19:59:50 **25 A. Correct.**
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19:59:51 **1 Q. Okay. And of the 70 percent, roughly half**
 19:59:54 **2 of that is talc related, the other half is roughly**
 19:59:57 **3 asbestos litigation related?**
 19:59:59 **4 A. Correct.**
 19:59:59 **5 Q. Okay. And of the 30 percent that's not**
 20:00:02 **6 litigation related, what percentage of that is**
 20:00:06 **7 related to testing for asbestos in any context?**
 20:00:09 **8 A. Well, that would be encompassed in the**
 20:00:11 **9 70 percent. So I haven't broken that out, but the**
 20:00:15 **10 other 30 percent is things like VOC testing for**
 20:00:18 **11 consumer reports or just materials analysis or**
 20:00:23 **12 projects.**
 20:00:25 **13 Q. Just -- what's VOC?**
 20:00:28 **14 A. Hmm?**
 20:00:28 **15 Q. I don't know what VOC is.**
 20:00:30 **16 A. Oh. Volatile organic compounds. It's**
 20:00:34 **17 green labeling, furniture testing, pharmaceutical**
 20:00:38 **18 work for our FDA certification -- not certification**
 20:00:41 **19 but our FDA lab number.**
 20:00:44 **20 Q. So --**
 20:00:46 **21 MR. CIRSCH: Were you done, Bill?**
 20:00:47 **22 THE WITNESS: Yes.**
 20:00:48 **23 Q. (By Mr. Chachkes) I recall that I had**
 20:00:49 **24 asked you a question about when you did the testing**
 20:00:51 **25 for the samples in your report, and you said**
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20:00:54 **1 November, October, December?**
 20:00:56 **2 A. It's all in the reports. You can go**
 20:00:58 **3 through the chain of custodies, you can see the dates**
 20:01:01 **4 on the analysis.**
 20:01:01 **5 Q. And what year? 2018?**
 20:01:03 **6 A. Yes, sir.**
 20:01:03 **7 Q. And during that time frame were you**
 20:01:10 **8 testing other samples of talc for asbestos?**
 20:01:16 **9 A. Yes.**
 20:01:16 **10 Q. And during that time frame were you**
 20:01:18 **11 testing other materials, not talc, for asbestos?**
 20:01:23 **12 A. Yes.**
 20:01:23 **13 Q. In that time frame were you testing**
 20:01:25 **14 asbestos?**
 20:01:27 **15 A. Well, we were doing regular PLM for**
 20:01:32 **16 products for added -- that have asbestos added to it,**
 20:01:36 **17 such as chrysotile, typically see chrysotile most of**
 20:01:39 **18 the time, some amosite.**
 20:01:41 **19 Q. Okay. Any products that you were testing**
 20:01:43 **20 that have either tremolite or anthophyllite in them?**
 20:01:46 **21 A. Other than cosmetic talc, no.**
 20:01:49 **22 Q. How many TEMs does your lab have?**
 20:01:51 **23 A. Four.**
 20:01:52 **24 Q. Do you use all four at the same time?**
 20:01:57 **25 A. If four analysts are busy, yes.**
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20:01:59 **1** Q. Are they all in the same room?
 20:02:01 **2** A. **No.**
 20:02:01 **3** Q. Are they each -- do they each have their
 20:02:06 **4** own TEM room?
 20:02:07 **5** A. **Yes.**
 20:02:07 **6** Q. So in a given TEM room is it just the TEM
 20:02:11 **7** there that's for testing?
 20:02:13 **8** A. **Correct.**
 20:02:14 **9** Q. There's no PLM or XRD in the TEM room?
 20:02:21 **10** A. **No.**
 20:02:21 **11** Q. Do you use the same PLMs for
 20:02:27 **12** asbestos-containing material as you use for testing
 20:02:29 **13** talc?
 20:02:30 **14** A. **No. We have a specific PLM scope that has**
 20:02:35 **15** **been modified to enhance sensitivity.**
 20:02:39 **16** Q. So that PLM is only used for talc?
 20:02:41 **17** A. **Yes.**
 20:02:41 **18** Q. Are your talc samples handled in the same
 20:02:46 **19** room as asbestos samples?
 20:02:47 **20** A. **No.**
 20:02:47 **21** Q. Does MAS have a clean room?
 20:02:49 **22** A. **We don't have a Class 100 clean room. We**
 20:02:54 **23** **have a specific room set up just for cosmetic talc.**
 20:02:58 **24** Q. And what steps -- why haven't you
 20:03:03 **25** constructed a clean room?
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20:03:06 **1** MR. CIRSCH: Object to form.
 20:03:06 **2** THE WITNESS: Because there's no need to.
 20:03:08 **3** If there's any work that is done on any of these
 20:03:11 **4** materials, they're done in a biological hood so
 20:03:17 **5** that if there's any escape of material, it can
 20:03:22 **6** be filtered. We don't do a clean room.
 20:03:24 **7** Q. (By Mr. Chachkes) Okay.
 20:03:24 **8** A. **It's a clean hood but not a clean room.**
 20:03:27 **9** Q. Okay. So your aliquot of a particular
 20:03:32 **10** bottle for the purpose of doing a TEM test or whether
 20:03:35 **11** it's a PLM test, that aliquot's taken out in a hood?
 20:03:38 **12** A. **Yes. Your experts have been to our lab**
 20:03:41 **13** **and one will be there tomorrow. You can ask him what**
 20:03:44 **14** **they see when they get there to get their aliquots.**
 20:03:47 **15** Q. Does MAS test -- strike that.
 20:03:49 **16** Does the same analysts who test
 20:03:54 **17** asbestos-containing material in your lab, do they
 20:03:56 **18** also test for -- test talc for asbestos?
 20:03:59 **19** A. **No. The same analysts for PLM? I mean, I**
 20:04:05 **20** **guess I need clarification of that question.**
 20:04:07 **21** Q. How about for TEM?
 20:04:08 **22** A. **TEM, if we have other samples that are**
 20:04:11 **23** **being run, the same analyst will do that sample, too,**
 20:04:14 **24** **in the TEM.**
 20:04:15 **25** Q. Do your analysts wear any sort of special

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20:04:18 **1** clothing when testing talcum powder samples for
 20:04:21 **2** asbestos?
 20:04:21 **3** A. **No. They use special hoods. There is no**
 20:04:28 **4** **danger of being exposed to asbestos in the talcum**
 20:04:33 **5** **powder when you're pulling out TEM grids. It's**
 20:04:37 **6** **trapped onto the TEM grids.**
 20:04:39 **7** **There's never been, that I've heard of, of**
 20:04:41 **8** **somebody getting exposed there. Everything is done**
 20:04:43 **9** **in safety hoods. So none of our analysts are being**
 20:04:46 **10** **exposed.**
 20:04:46 **11** Q. What was -- is it Dr. Rigler?
 20:04:50 **12** A. **Yes, it is.**
 20:04:51 **13** Q. What is Dr. Rigler's contribution to your
 20:04:55 **14** expert report in this case?
 20:04:56 **15** A. **His contribution was to review it, to**
 20:05:00 **16** **review all the data, to look at the data, make sure**
 20:05:04 **17** **it's matched in the appropriate places. And he did**
 20:05:09 **18** **the QA/QC report, so you can ask him tomorrow why he**
 20:05:13 **19** **didn't put that one chart in. That's primarily it**
 20:05:16 **20** **for this report.**
 20:05:17 **21** Q. When you say review the data, does that
 20:05:20 **22** mean he reviewed it in the same substantive way that
 20:05:24 **23** you did to make sure the analysts did their job?
 20:05:26 **24** A. **No. But he would review it that the data**
 20:05:29 **25** **is there for the appropriate materials. But he**
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20:05:34 **1** **doesn't review it like I do.**
 20:05:36 **2** **When I review the data, I review every**
 20:05:39 **3** **sheet, every micrograph, every diffraction pattern so**
 20:05:44 **4** **that I concur with the analysts' findings for the**
 20:05:48 **5** **various tests that we've done.**
 20:05:50 **6** Q. So is it fair to say that his review is
 20:05:55 **7** more sort of, let's say, a typo level and consistency
 20:06:02 **8** level as opposed to substantive level?
 20:06:05 **9** A. **You'll have to ask him how much**
 20:06:07 **10** **substantive level. But he was a TEM microscopist.**
 20:06:11 **11** **He knows what the EDS pattern -- EDXA patterns look**
 20:06:17 **12** **like and what they should be. He looks for the**
 20:06:20 **13** **identification. But his -- but mine's more in depth**
 20:06:25 **14** **on the data than his is.**
 20:06:27 **15** Q. Okay. Is he qualified to testify about
 20:06:32 **16** how EDXA is -- EDSA -- EDXA is run?
 20:06:37 **17** A. **Sure.**
 20:06:37 **18** Q. Okay. And he's qualified to testify how
 20:06:40 **19** PLM is run?
 20:06:40 **20** A. **He's not a PLM analyst. I don't know how**
 20:06:45 **21** **much knowledge he has or if he could -- like I could,**
 20:06:49 **22** **take me a while to sit down and actually analyze a**
 20:06:53 **23** **PLM sample.**
 20:06:53 **24** Q. What about XRD, is he an expert in XRD?
 20:07:06 **25** A. **I don't believe so.**

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20:07:07 1 Q. Okay. What about SAED?

20:07:11 2 A. Could he index a diffraction pattern by

20:07:16 3 hand? You'll have to ask him.

20:07:18 4 Q. Okay. Did he do any sort of substantive

20:07:20 5 review of the SAED patterns?

20:07:23 6 A. He knows the differences between talc

20:07:27 7 patterns and anthophyllite type patterns, but that

20:07:30 8 really was all my responsibility.

20:07:32 9 Q. Okay. Does he have any responsibility for

20:07:36 10 reviewing EDXA readouts?

20:07:40 11 A. He did review them. He knows EDS spectras

20:07:45 12 and the classic ratios of elements, silica to metals,

20:07:51 13 that you would expect for these types of regulated

20:07:56 14 asbestos fibers and bundles.

20:07:58 15 Q. Is he qualified to testify to the same

20:08:05 16 degree and substance as you regarding your January

20:08:08 17 report?

20:08:09 18 A. I don't know. I don't believe -- I don't

20:08:11 19 believe he is as in-depth as I am on this January

20:08:15 20 report with the data. I believe what his

20:08:19 21 responsibility is, he can recognize the appropriate

20:08:22 22 EDS patterns for the appropriate regulated asbestos.

20:08:26 23 He's not a PLM analyst. He has reviewed -- he looks

20:08:31 24 over, makes sure the materials are present, the

20:08:36 25 QA/QC, the chains of custody, that sort of thing.

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20:08:38 1 Q. Could he substitute for you as an expert

20:08:51 2 in the case presenting this report?

20:08:54 3 MR. CIRSCH: Object to form.

20:08:55 4 THE WITNESS: I don't know.

20:08:57 5 Q. (By Mr. Chachkes) That would be a

20:08:58 6 question for him?

20:08:59 7 A. You know, if I leave here and get hit by a

20:09:02 8 bus, I guess we'll find out.

20:09:05 9 Q. Would that be a question for him?

20:09:07 10 A. Hoping that Dr. Longo get hits by a bus so

20:09:11 11 he can step in and take my place?

20:09:12 12 Q. Let's take the latter first.

20:09:14 13 A. You'll have to ask him.

20:09:15 14 Q. Okay. Why did you involve him?

20:09:21 15 A. Because he's one of our senior scientists,

20:09:23 16 and I involved him very early on. Dr. Rigler and I

20:09:27 17 spent a lot of time collaborating together when we

20:09:32 18 initially took on this project.

20:09:34 19 And the main thing was we didn't feel it

20:09:36 20 was the right thing to do to do the TEM long -- what

20:09:40 21 I call the TEM long method, where to get some

20:09:44 22 reasonable detection limits, you have to look at

20:09:46 23 500,000 grid openings. That ties up a TEM too long,

20:09:52 24 and I just didn't think it was very efficient.

20:09:54 25 We talked about the heavy liquid density

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20:09:56 1 separation early on, that that was the way to go, the

20:09:59 2 problems associated with it because of the density of

20:10:03 3 anthophyllite without iron versus iron.

20:10:06 4 Chrysotile issue, I'm sure we'll figure

20:10:09 5 out together on how to extract chrysotile using the

20:10:13 6 old Windsor method with citric acid. He's a very

20:10:18 7 bright scientist.

20:10:19 8 Q. You've issued reports on other bottles of

20:10:22 9 J&J talc not in the MDL where he wasn't a coauthor of

20:10:25 10 the report; correct?

20:10:26 11 A. Is that right?

20:10:27 12 Q. I'm asking.

20:10:28 13 A. I think he's been on every report.

20:10:30 14 MR. CHACHKES: Okay.

20:10:33 15 I think I have no further questions, but

20:10:36 16 there are other people, and I'm just going to

20:10:38 17 maintain the objection I stated at the

20:10:39 18 beginning, which is we'll have to review the

20:10:43 19 enormous amount of data that was belatedly

20:10:45 20 produced and determine whether to re-call the

20:10:46 21 witness.

20:10:46 22 MR. PROST: I'm happy to go now. I don't

20:10:50 23 have much.

20:13:19 24 (Off the record.)

20:13:19 25 MR. CHACHKES: Just to amend what I said

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20:13:21 1 before, I'm going to reserve time after the

20:13:23 2 other defendant or defendants ask their

20:13:27 3 questions, which will give me time to review my

20:13:33 4 notes to see if I'm actually done.

20:13:35 5 EXAMINATION

20:13:35 6 BY MR. PROST:

20:13:35 7 Q. Hi, Dr. Longo.

20:13:39 8 A. Good evening.

20:13:39 9 Q. With respect to Dr. Rigler, did he subject

20:13:41 10 any substantive changes?

20:13:43 11 A. He might have.

20:13:44 12 Q. You don't recall any as you sit here?

20:13:47 13 A. No. I mean, we all have our own editing

20:13:51 14 style. Sometimes he'd say this doesn't make any

20:13:52 15 sense, which is not uncommon with my struggle with

20:13:56 16 the English language.

20:13:57 17 Q. Okay. You mentioned that you do not store

20:14:01 18 talc and asbestos samples in the same room at MAS?

20:14:04 19 A. Correct.

20:14:04 20 Q. Do you store all of your talc samples in

20:14:08 21 the same room regardless of the manufacturer or

20:14:12 22 supplier?

20:14:13 23 A. They are stored in the same room in

20:14:17 24 separate containers, separate sealed bags, and

20:14:21 25 separate locked cabinets.

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20:14:22 **1** Q. Are there other talc samples provided by
 20:14:24 **2** other manufacturers or suppliers other than Johnson &
 20:14:27 **3** Johnson?
 20:14:27 **4** A. **Yes.**
 20:14:28 **5** Q. How many others?
 20:14:29 **6** A. **A number.**
 20:14:32 **7** Q. More than five?
 20:14:35 **8** A. **I don't know.**
 20:14:37 **9** Q. And these samples span decades from these
 20:14:41 **10** other manufacturers as to Johnson & Johnson?
 20:14:44 **11** A. **Typically.**
 20:14:44 **12** Q. With respect to fibrous talc, I think I
 20:14:49 **13** heard you say this, but fibrous talc is not asbestos;
 20:14:52 **14** right?
 20:14:53 **15** MS. O'DELL: Object to form.
 20:14:54 **16** THE WITNESS: It's not one of the
 20:14:55 **17** regulated asbestos types.
 20:14:56 **18** Q. (By Mr. Prost) And so no matter the shape
 20:14:57 **19** or size or aspect ratio, if it's chemically talc,
 20:15:01 **20** it's not asbestos?
 20:15:02 **21** A. **It is not one of the regulated asbestos**
 20:15:07 **22 types that we would report as asbestos.**
 20:15:09 **23** Q. You attempted to quantify the fibrous talc
 20:15:13 **24** in your most recent January 15, 2019, report; is that
 20:15:19 **25** right?
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20:15:19 **1** A. **Yes.**
 20:15:19 **2** Q. And just describe briefly how you did
 20:15:21 **3** that.
 20:15:21 **4** A. **It's very qualitative. The analyst for**
 20:15:25 **5 each of these samples going all the way back, they**
 20:15:28 **6 make an estimate of the number of particles they're**
 20:15:33 **7 seeing in the grid openings as they go through their**
 20:15:36 **8 100 grid openings.**
 20:15:37 **9 At the end of that analysis, they'll state**
 20:15:39 **10 that I was typically seeing one or two or three, and**
 20:15:43 **11 then they'll record one of the typical asbestos talc**
 20:15:49 **12 fibers, diffraction pattern, EDS.**
 20:15:52 **13 So it's a qualitative estimate.**
 20:15:54 **14** Q. In your March 2018 report, did you attempt
 20:15:59 **15** to quantify the fibrous talc?
 20:16:01 **16** A. **We collected the data, as I recall, but I**
 20:16:05 **17 didn't go through the exercise of just doing the**
 20:16:07 **18 math.**
 20:16:08 **19** Q. Why did you change your methodology in the
 20:16:11 **20** quantification of fibrous talc between your
 20:16:14 **21** March 2018 report and in your most recent report?
 20:16:16 **22** MR. CIRSCH: Object to form.
 20:16:17 **23** THE WITNESS: I became curious on how much
 20:16:20 **24** fibrous talc is in the samples where we're
 20:16:22 **25** seeing fibrous talc. Some samples we see it,
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20:16:25 **1** some we don't, especially by TEM. PLM, it's
 20:16:29 **2** just about in every sample.
 20:16:32 **3** With the heavy liquid density separation,
 20:16:35 **4** you know, theoretically, you should be removing
 20:16:37 **5** all the fibrous talc along with the platy talc,
 20:16:40 **6** but there is some fibers in there.
 20:16:42 **7** A true quantitative analysis where -- is
 20:16:45 **8** to take any of these samples that have fibrous
 20:16:48 **9** talc in and do a regular no heavy liquid density
 20:16:53 **10** separation and see how many orders of magnitude
 20:16:56 **11** the fibrous talc is compared to what we're
 20:16:59 **12** seeing in TEM with the heavy density liquid
 20:17:02 **13** separation.
 20:17:02 **14** Q. (By Mr. Prost) On page 13 of your
 20:17:04 **15** January 2019 report, you quantify it as abundant,
 20:17:10 **16** common, or trace; is that right?
 20:17:11 **17** A. **Yes.**
 20:17:12 **18** Q. And is there any published or
 20:17:16 **19** peer-reviewed literature that guided those
 20:17:19 **20** categories, or is that something that you or MAS came
 20:17:21 **21** up with?
 20:17:22 **22** A. **It was our collective -- what would you**
 20:17:26 **23 say is trace, how do we kind of give some information**
 20:17:28 **24 about it, because that's what we were doing for a**
 20:17:31 **25 while.**
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20:17:33 **1** **Now we're just using the trace as it's one**
 20:17:37 **2 to three, on average, per opening. And to do the**
 20:17:41 **3 analysis or do the semiquantitative estimation of the**
 20:17:45 **4 number of fibrous talc structures per gram, we just**
 20:17:49 **5 use one per grid opening.**
 20:17:51 **6** Q. So there is no established standard for
 20:17:54 **7** those three categories that you relied upon?
 20:17:59 **8** MS. O'DELL: Object to the form.
 20:18:00 **9** THE WITNESS: I don't think I've seen a
 20:18:02 **10** document that says if you see fibrous talc, if
 20:18:04 **11** you only have one or two particles, that it's
 20:18:06 **12** trace. And it's not -- it's trace compared to
 20:18:08 **13** what you're seeing there so that you can give
 20:18:10 **14** some qualitative estimate.
 20:18:14 **15** And we were using this before I got the
 20:18:17 **16** idea of actually doing a qualitative count based
 20:18:21 **17** on one fibrous talc structure per opening.
 20:18:27 **18** Q. (By Mr. Prost) Have you done any quality
 20:18:29 **19** assurance reports for fibrous talc?
 20:18:32 **20** A. **No, sir.**
 20:18:33 **21** Q. And how long have you been analyzing
 20:18:43 **22** materials for asbestos content? When is the first
 20:18:46 **23** time you did that? How many years ago?
 20:18:48 **24** A. **The first TEM grids that I ever analyzed**
 20:18:53 **25 are in a -- stuck on a petri dish and I have it on**
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20:18:58 **1 the wall. I think it was about approximately 1985 or**
 20:19:02 **2 1986.**
 20:19:03 **3 Q. Is the first time that you ever documented**
 20:19:05 **4 fibrous talc 2018?**
 20:19:07 **5 A. No. I used to do a lot of product ID in**
 20:19:17 **6 the property damage cases, and one of the**
 20:19:20 **7 fingerprints for U.S. Gypsum Audicote Acoustical**
 20:19:26 **8 Plaster was that it had approximately 10 percent**
 20:19:29 **9 International Talc in it. And International Talc,**
 20:19:34 **10 obviously, eventually is Vanderbilt Talc when they**
 20:19:37 **11 bought that. And it was a fibrous talc component, so**
 20:19:40 **12 we were constantly analyzing for fibrous talc.**
 20:19:43 **13 Because U.S. Gypsum Audicote was the only**
 20:19:47 **14 acoustical plaster out there that had a combination**
 20:19:49 **15 of 10 percent perlite -- excuse me -- 10 percent**
 20:19:53 **16 chrysotile, 60 percent perlite, approximately**
 20:19:57 **17 10 percent fibrous talc, and the rest of it was**
 20:20:02 **18 bentonite clay, Wyoming type, and then a few**
 20:20:06 **19 percentages, 2 or 3 percent of calcium carbonate.**
 20:20:09 **20 That fibrous talc was the fingerprint for**
 20:20:12 **21 that product. So we spent a lot of time in these**
 20:20:15 **22 types of situations debating fibrous talc.**
 20:20:20 **23 And I must have done that -- and that was**
 20:20:22 **24 when I was doing all the TEM analysis on the product**
 20:20:25 **25 ID. I bet I analyzed hundreds and hundreds and**
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20:20:28 **1 hundreds of samples specifically, besides looking for**
 20:20:31 **2 the other primary ingredients, is looking at and**
 20:20:34 **3 making sure if it was U.S. Gypsum Audicote versus**
 20:20:38 **4 National Gypsum spray -- God, I've forgotten the**
 20:20:44 **5 name -- or one of the other without the fibrous talc.**
 20:20:47 **6 Q. That was all industrial talc?**
 20:20:50 **7 A. Yes.**
 20:20:50 **8 Q. So the first time you would have**
 20:20:53 **9 documented the presence of fibrous talc in cosmetic**
 20:20:56 **10 talc, would that have been 2018?**
 20:20:58 **11 A. Whenever we first started doing these**
 20:21:00 **12 analyses. I think that was November, December,**
 20:21:05 **13 January, or so, in early 2018.**
 20:21:08 **14 Q. I know you're not giving any medical**
 20:21:11 **15 causation opinions with respect to disease or ovarian**
 20:21:18 **16 cancer, am I also correct you're not going to offer**
 20:21:19 **17 any opinions as to the root of exposure, whether it**
 20:21:23 **18 be the female reproductive tract versus inhalation;**
 20:21:23 **19 is that correct?**
 20:21:23 **20 A. That is correct. I will not be giving**
 20:21:26 **21 those types of opinions.**
 20:21:27 **22 Q. You've never been to a talc mine?**
 20:21:30 **23 A. I still haven't.**
 20:21:30 **24 Q. You've not studied the geology of the**
 20:21:34 **25 mines in Vermont or China, have you?**
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20:21:37 **1 MR. CIRSCH: Object to form.**
 20:21:38 **2 THE WITNESS: I am not a geologist. My**
 20:21:40 **3 role is what's in the bottle.**
 20:21:41 **4 Q. (By Mr. Prost) Do you agree that the**
 20:21:44 **5 geologic process that controls the formation of any**
 20:21:47 **6 given talc deposits are unique?**
 20:21:49 **7 MS. O'DELL: Object to the form.**
 20:21:50 **8 THE WITNESS: I'm not a geologist. I**
 20:21:52 **9 don't know how unique, especially for the**
 20:21:56 **10 Vermont and Italian mines. We see from those**
 20:22:01 **11 time periods that they have asbestos.**
 20:22:02 **12 So I'll let other geologists say how**
 20:22:05 **13 unique or not unique they are. That's not my**
 20:22:07 **14 area.**
 20:22:07 **15 Q. (By Mr. Prost) You would expect the**
 20:22:09 **16 accessory minerals in any given talc deposit to be**
 20:22:12 **17 different from one continent to another, wouldn't**
 20:22:15 **18 you?**
 20:22:15 **19 MR. CIRSCH: Object to form.**
 20:22:16 **20 THE WITNESS: I don't have an expectation**
 20:22:18 **21 one way or the other.**
 20:22:18 **22 Q. (By Mr. Prost) You can't name for me the**
 20:22:21 **23 mines in Vermont that would have been sourced for J&J**
 20:22:24 **24 baby powder, can you?**
 20:22:26 **25 A. Besides Hammondsville, Argonaut, and**
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20:22:30 **1 what's the other one? I'm missing one.**
 20:22:32 **2 Q. You're not able to break down the samples**
 20:22:36 **3 that you've tested in your reports pertaining to any**
 20:22:40 **4 specific mine in Vermont or a year, are you?**
 20:22:42 **5 A. Without going through all the documents**
 20:22:44 **6 showing that when you switched from Hammonds -- or**
 20:22:49 **7 Argonaut, there's specific years in discovery, but I**
 20:22:50 **8 haven't bothered doing -- I haven't done that, if**
 20:22:54 **9 it's important.**
 20:22:54 **10 Q. All right. Do you know when Imerys began**
 20:22:57 **11 supplying talc for Johnson & Johnson Baby Powder?**
 20:23:00 **12 A. It's always unclear to me. Of course,**
 20:23:07 **13 it's the -- in 1980 we have some -- maybe with the**
 20:23:12 **14 Vermont and the later '80s.**
 20:23:17 **15 I haven't memorized -- and because we've**
 20:23:21 **16 been going so long, I'm tired. I've had that**
 20:23:24 **17 information at the tip of my tongue before, but I**
 20:23:26 **18 would have to look it back up what Imerys says in**
 20:23:30 **19 their sworn interrogatories when they started doing**
 20:23:32 **20 that, as well as Johnson & Johnson when they say they**
 20:23:34 **21 started buying it versus when it was their own mine**
 20:23:37 **22 and that sort of thing.**
 20:23:38 **23 Q. Are you familiar or knowledgeable**
 20:23:40 **24 regarding the selective mining processes that Imerys**
 20:23:44 **25 would have used?**
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20:23:45 **1 A. Is that like the video where they were**
 20:23:47 **2 blowing it up?**
 20:23:50 **3 I'm not here to talk about selective**
 20:23:52 **4 mining processes or not. My role is just an analysis**
 20:23:57 **5 of what's in these particular containers.**
 20:24:01 **6 Q.** You're not familiar or knowledgeable
 20:24:03 **7** regarding the flotation process that Imerys used over
 20:24:06 **8** the years, are you?
 20:24:07 **9 A. I've read a lot about it. In fact, we're**
 20:24:09 **10 going to use one, I believe, with the citric acid to**
 20:24:13 **11 try to concentrate the chrysotile if present.**
 20:24:17 **12 So without looking at it and going through**
 20:24:21 **13 the processes that have been stated in a lot of the**
 20:24:25 **14 documents I've read, other than that, no.**
 20:24:27 **15 Q.** Are you aware of any published literature
 20:24:31 **16** stating that any of the mines used to source
 20:24:35 **17** Johnson & Johnson Baby Powder were contaminated with
 20:24:38 **18** asbestos or amphibole asbestos?
 20:24:40 **19 A. Published literature versus in-house**
 20:24:44 **20 testing and company's own stuff?**
 20:24:47 **21 Q.** Say peer-reviewed literature.
 20:24:49 **22 A. I'm sorry, could you repeat that?**
 20:24:52 **23 Q.** Are you aware of any peer-reviewed
 20:24:54 **24** literature stating that any of the mines used to
 20:24:56 **25** source Johnson & Johnson's Baby Powder or Shower to
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20:24:59 **1** Shower were contaminated with amphibole asbestos or
 20:25:02 **2** chrysotile?
 20:25:03 **3** MS. O'DELL: Object to the form.
 20:25:04 **4** THE WITNESS: I mean, the geological
 20:25:06 **5** reports that go back and -- and Alice Blount can
 20:25:10 **6** pick on -- Alice Blount didn't say that this
 20:25:13 **7** came from Vermont. I assume she knows where, as
 20:25:15 **8** a geologist, as a consultant, where that talc
 20:25:18 **9** came for that 1989 or that 1990 bottle of
 20:25:22 **10** Johnson's Baby Powder that she tested to show
 20:25:25 **11** tremolite asbestos.
 20:25:27 **12** But an actual peer-reviewed publication
 20:25:30 **13** stating that the accessory minerals are asbestos
 20:25:33 **14** type or regulated asbestos as counted by these
 20:25:41 **15** standard peer-reviewed protocols, I can't think
 20:25:45 **16** of any.
 20:25:46 **17 Q.** (By Mr. Prost) Have you read Alice
 20:25:48 **18** Blount's deposition transcript from the Ingham case?
 20:25:50 **19 A. I have.**
 20:25:51 **20 Q.** And is it your belief from reading that
 20:25:55 **21** testimony that she's saying that sample I from her
 20:25:59 **22** 1990 report was a bottle of Johnson & Johnson Baby
 20:26:03 **23** Powder?
 20:26:03 **24 A. She says it is.**
 20:26:03 **25 Q.** Did you read where she said she bought
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20:26:06 **1** that bottle in 1996?
 20:26:10 **2** MR. CIRSCH: Object to form.
 20:26:11 **3** THE WITNESS: Well, that would have been
 20:26:12 **4** hard to go back in time with it. I think she
 20:26:14 **5** also testified that she bought a number of
 20:26:16 **6** bottles over the years.
 20:26:17 **7 Q.** (By Mr. Prost) You would agree she was a
 20:26:19 **8** bit confused in her deposition?
 20:26:21 **9** MR. CIRSCH: Object to form.
 20:26:21 **10** THE WITNESS: No, sir, I don't make that
 20:26:23 **11** judgment about anybody.
 20:26:24 **12 Q.** (By Mr. Prost) I've heard it read and
 20:26:30 **13** think you've probably been asked this before, but
 20:26:32 **14** would you agree that less than 1 percent of the
 20:26:35 **15** amphiboles in the world are asbestiform?
 20:26:39 **16** MR. CIRSCH: Object to form.
 20:26:40 **17** THE WITNESS: You know, I just don't know
 20:26:51 **18** what 1 percent of probably, I don't know, how
 20:26:54 **19** many zero tons of amphibole's out there.
 20:26:57 **20** Sometimes people seem to suggest that 1 percent
 20:27:00 **21** isn't very much. 1 percent of something really
 20:27:02 **22** big tends to be a lot.
 20:27:04 **23 Q.** (By Mr. Prost) You're familiar with
 20:27:05 **24** peer-reviewed studies, though, that have said that;
25 right?
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20:27:09 **1 A. Yes, sir.**
 20:27:09 **2 Q.** And you don't have reason to disagree with
 20:27:11 **3** that, do you?
 20:27:13 **4 A. No, sir. I'm just curious on if you were**
 20:27:15 **5 to take every amphibole mineral in the world and then**
 20:27:18 **6 say only 1 percent of that is asbestos. There**
 20:27:22 **7 certainly seems to be enough amphibole asbestos in**
 20:27:25 **8 the world to supply a very large contingent of**
 20:27:29 **9 products over the years until it got all banned or no**
 20:27:33 **10 longer made for amphiboles.**
 20:27:34 **11 So I don't have any -- I can't give you a**
 20:27:36 **12 relationship what 1 percent means. It's not**
 20:27:40 **13 1 percent of a pound. It's 1 percent of -- I don't**
 20:27:43 **14 know how many -- how you would weigh it all.**
 20:27:47 **15 Q.** I know you might think it's still a lot,
 20:27:50 **16** but you have no reason to disagree with the
 20:27:52 **17** peer-reviewed literature that you've seen that has
 20:27:54 **18** said that less than 1 percent of the amphiboles in
 20:28:00 **19** the earth's crust is asbestiform?
 20:28:04 **20 A. No, sir. I just was curious how much of**
 20:28:06 **21 the crust is made up of the percentage of what the**
 20:28:10 **22 weight is.**
 20:28:11 **23 Q.** I think I've seen you testify before --
 20:28:13 **24** and I want to see if you still agree -- if an
 20:28:16 **25** amphibole is crystallized in a nonasbestiform habit,
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20:28:22 **1** no matter how much you can grind it up, it can never
20:28:26 **2** turn into asbestos or asbestiform?
20:28:29 **3** MR. CIRSCH: Object to form.
20:28:30 **4** THE WITNESS: It's unclear to me what an
20:28:33 **5** nonasbestiform habit is other than you may have
20:28:36 **6** massive, blocky. It's all a geological shape.
20:28:39 **7** If you grind up a rock, you do not produce
20:28:44 **8** asbestos. If you grind up tremolitic -- massive
20:28:50 **9** tremolitic, you typically will get both, but you
20:28:53 **10** will not get bundles.
20:28:55 **11** What we do is count it as regulated
20:28:58 **12** asbestos per the protocols.
20:29:01 **13** Q. (By Mr. Prost) Right. So if it
20:29:03 **14** crystallizes in a nonasbestiform habit, tremolite,
20:29:06 **15** for example, and you grind it up and it falls under
20:29:09 **16** the counting rules you use, you call it asbestiform,
20:29:12 **17** regardless; right?
20:29:14 **18** MR. CIRSCH: Object to form.
20:29:15 **19** THE WITNESS: Well, everything we've
20:29:17 **20** looked at has crystallized in a fibrous habit.
20:29:20 **21** Asbestiform habit and fibrous habit are the same
20:29:23 **22** thing because we're looking at fibers.
20:29:25 **23** If you look at all the crystalline habits,
20:29:27 **24** there's a wide range, and most of them are not
20:29:29 **25** fibrous, only one where they would call fibrous.
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20:29:33 **1** But you're not going to get an asbestiform
20:29:36 **2** bundle from grinding up cleavage fragments.
20:29:40 **3** Q. (By Mr. Prost) I'm not talking about what
20:29:42 **4** you've seen or looked at or issued in your report;
20:29:44 **5** but just hypothetically, if you have nonasbestiform
20:29:47 **6** tremolite or amphibole that's crystallized in a
20:29:50 **7** nonasbestiform habit, no matter -- if someone were to
20:29:54 **8** grind that up so that the shape came out to be, under
20:29:58 **9** the counting rules that you go by, you would still
20:30:00 **10** call that asbestiform?
20:30:03 **11** MR. CIRSCH: Object to form.
20:30:04 **12** THE WITNESS: Well, it's a hypothetical I
20:30:05 **13** don't believe exists. If you grind up a rock or
20:30:08 **14** something that's massive, you get little pieces,
20:30:10 **15** irregular shapes. To get a perfectly parallel
20:30:15 **16** side I think is rare.
20:30:17 **17** And you have to look at what else we're
20:30:20 **18** seeing here. Every bundle is asbestiform. And
20:30:25 **19** you would think you would have the same type of
20:30:27 **20** crystalline habit that is generating both
20:30:31 **21** asbestiform as well as some cleavage fragments.
20:30:34 **22** We do see cleavage fragments. But it's my
20:30:38 **23** belief you get both. It's never one or the
20:30:40 **24** other.
20:30:40 **25** Q. (By Mr. Prost) If an amphibole is
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20:30:42 **1** fibrous, in your opinion, is it necessarily
20:30:44 **2** asbestiform?
20:30:47 **3** A. In my opinion, if it is fibrous, it is
20:30:49 **4** asbestiform because it has a form like asbestos.
20:30:52 **5** Q. Are you aware of any peer-reviewed studies
20:30:55 **6** to support that?
20:30:59 **7** A. Other than --
20:31:00 **8** Q. I'm sorry, that if an amphibole is
20:31:02 **9** fibrous, it necessarily has to be asbestiform?
20:31:06 **10** A. You know, other than the geological
20:31:09 **11** definition for a crystalline habit and that it is
20:31:12 **12** fibrous and, you know, whatever the population is,
20:31:16 **13** population is more than one.
20:31:18 **14** But we're getting enough data now that
20:31:20 **15** these populations -- and you just can't -- you know,
20:31:25 **16** no longer look at from a sample from the same mine
20:31:30 **17** that it's a unique thing.
20:31:31 **18** All the samples from the mine that we're
20:31:33 **19** seeing over and over again show asbestiform minerals
20:31:37 **20** in it, specifically tremolite series and the
20:31:39 **21** anthophyllite series.
20:31:42 **22** It's just my opinion. I mean, others may
20:31:44 **23** disagree, but that's my opinion.
20:31:45 **24** Q. Is there a specific article or
20:31:48 **25** peer-reviewed literature or study that says if you
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20:31:50 **1** have an amphibole and it's in a fibrous form, that it
20:31:53 **2** is necessarily asbestos or asbestiform?
20:31:57 **3** MR. CIRSCH: Object to form.
20:31:58 **4** THE WITNESS: Every protocol that we're
20:31:59 **5** using here has a definition of what you call a
20:32:01 **6** regulated asbestos. Everything that I have
20:32:04 **7** reported has followed the peer-reviewed
20:32:06 **8** protocols and methods to say it is a regulated
20:32:09 **9** asbestos that is fibrous to whatever degree they
20:32:12 **10** use for their counting rules. In my opinion,
20:32:14 **11** that makes it all asbestiform.
20:32:15 **12** Q. (By Mr. Prost) So the counting rules and
20:32:16 **13** the protocols that you used for your reports are what
20:32:22 **14** you're talking about?
20:32:22 **15** A. Yes, sir.
20:32:23 **16** Q. No other articles or papers that you can
20:32:26 **17** think of?
20:32:26 **18** A. Not as I sit here this second, no.
20:32:28 **19** Q. Are you aware of any peer-reviewed
20:32:30 **20** articles or literature that say the opposite, that
20:32:32 **21** you can have fibrous amphiboles that are not
20:32:35 **22** asbestiform?
20:32:37 **23** A. There's a couple.
20:32:39 **24** MS. O'DELL: Object.
20:32:40 **25** Q. (By Mr. Prost) And who would those be
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20:32:41 1 from?

20:32:41 2 A. Oh, I think Ann Wylie has published one or

20:32:44 3 two. Just depends on who the authors are.

20:32:48 4 Q. And you just disagree with that?

20:32:50 5 A. Well, I don't agree with their opinions

20:32:52 6 that if it is a bundle. But I disagree that if you

20:32:56 7 take an individual fiber that you can't tell one way

20:32:59 8 or the other because it has the same chemistry, it

20:33:03 9 has the same crystalline pattern, it has the same

20:33:07 10 surface charge, and it's called a regulated asbestos

20:33:10 11 fiber, if it meets all that counting criteria. In my

20:33:15 12 opinion, if it is fibrous and it is asbestos, it is

20:33:19 13 asbestiform.

20:33:20 14 Q. I know you think that or you testified

20:33:23 15 that high tensile strength and flexibility don't mean

20:33:26 16 much because they can't be measured, I think; is that

20:33:29 17 a fair way of describing what you've said or what

20:33:32 18 your opinion is?

20:33:33 19 A. Well, it's not defined. And both the

20:33:36 20 polarized light microscope as well as the

20:33:39 21 transmission electron microscope do not have any

20:33:43 22 ability to make those measurements. It's just a

20:33:45 23 general description.

20:33:47 24 Q. Wouldn't you agree that there's ways to

20:33:50 25 observe whether something has high tensile strength

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20:33:53 1 and flexibility?

20:33:54 2 A. Sure. If you go to the mine and get a --

20:33:57 3 I think a 10 centimeter sample is the minimum, and

20:34:00 4 tape it to paper and go put it on an Instron, which

20:34:03 5 is a device that will measure tensile strength, I

20:34:07 6 wouldn't want to be standing around when you do it.

20:34:10 7 Because when they pop, they'll spread fibers

20:34:14 8 everywhere because you're just dealing with large

20:34:17 9 bundles.

20:34:17 10 With a transmission electron microscope,

20:34:19 11 with a polarized light microscope, or even XRD, it's

20:34:22 12 impossible. There is no ability to make that

20:34:25 13 measurement. And standard protocols for making

20:34:29 14 determinations or measurements lay out how you do

20:34:31 15 that. They don't even define what high tensile

20:34:35 16 strength is.

20:34:36 17 Q. Under PLM, is it your opinion that --

20:34:40 18 sounds like it is your opinion -- it is impossible to

20:34:43 19 make a determination whether a population of fibers

20:34:48 20 or a bundle has high tensile strength or flexibility?

20:34:52 21 A. It is impossible. And they don't provide

20:34:56 22 you any method for doing that.

20:34:57 23 Q. In terms of curvature, splayed ends,

20:35:03 24 parallel sides, that sort of thing, you don't think

20:35:04 25 that gives any guidance on the observance of high

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20:35:08 1 tensile strength and flexibility?

20:35:09 2 MR. CIRSCH: Object to form.

20:35:10 3 THE WITNESS: No. You know, if you're

20:35:13 4 going to look at the published literature for

20:35:14 5 high tensile strength for chrysotile, amosite,

20:35:18 6 and crocidolite, you're running around 90,000 to

20:35:21 7 120,000 psi.

20:35:22 8 If you look at what the characteristics or

20:35:25 9 tensile strength is for tremolite anthophyllite,

20:35:27 10 it's about 4,000 psi, and it's brittle. And

20:35:31 11 you're milling it.

20:35:32 12 So if you can see the bundles at times

20:35:35 13 that we get, you can see where it has been

20:35:38 14 milled and broken in half. There's nothing

20:35:41 15 there to do that.

20:35:42 16 When we identify regulated asbestos in the

20:35:45 17 PLM method, it meets the criteria for what they

20:35:49 18 say is regulated. It has -- those individual

20:35:52 19 fibers and those bundles are all greater,

20:35:55 20 typically, on average, greater than 20-to-1.

20:35:58 21 They can be broken down to smaller fibers

20:36:00 22 and bundles. It's greater than -- the width of

20:36:04 23 the structure is greater than 5 micrometers. It

20:36:07 24 meets the criteria for the ISO 22262-2.

20:36:11 25 Nowhere in any of that method does it tell

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20:36:14 1 you, oh, you better measure the tensile

20:36:17 2 strength.

20:36:17 3 Q. (By Mr. Prost) The 34 or 35 samples from

20:36:21 4 your March 2018 report, you're still relying upon the

20:36:25 5 results of that report here in the MDL; is that

20:36:29 6 right?

20:36:29 7 A. No, I'm not. I'm relying on the MDL

20:36:32 8 report. The only thing that the MDL does is verify

20:36:36 9 our earlier findings, but I'm not relying on it here.

20:36:38 10 Q. Well, your MDL report includes the

20:36:40 11 findings of positive of what you're calling asbestos,

20:36:44 12 though, in those -- in terms of your computations of

20:36:47 13 the percentages?

20:36:47 14 A. I'm sorry, could you repeat that?

20:36:49 15 Q. Sorry, it was -- yeah, clumsy.

20:36:51 16 In your January 2019 MDL report, you're

20:36:54 17 including the findings of those original Johnson &

20:36:58 18 Johnson samples, those 35 in your overall

20:37:01 19 percentages, aren't you?

20:37:02 20 A. No. The only thing that's in there that

20:37:04 21 came from the original report is that MDL sample, the

20:37:10 22 1978 MDL sample. That's the only sample.

20:37:15 23 Q. You changed your methodology from the

20:37:19 24 March 2018 report until now. Why did you do that?

20:37:22 25 MR. CIRSCH: Object to form.

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20:37:23 1 THE WITNESS: Because we -- we didn't

20:37:27 2 really change it. We just started using the

20:37:31 3 definitions and the ability for the ISO 22262-2

20:37:35 4 because it's an International Standard that has

20:37:37 5 been peer-reviewed by all the international

20:37:41 6 scientists that are on it or in the committees,

20:37:44 7 and it provides a standard method other than

20:37:47 8 just the Blount heavy density liquid separation

20:37:50 9 and TEM.

20:37:51 10 Q. (By Mr. Prost) Is the method you're doing

20:37:53 11 now more reliable than what you did last year?

20:37:55 12 A. No.

20:37:56 13 MR. CIRSCH: Object to form.

20:37:56 14 THE WITNESS: They are both reliable.

20:37:59 15 Q. (By Mr. Prost) Is your concentration

20:38:02 16 preparation any different now than what you did in

20:38:07 17 early 2018, that first report?

20:38:10 18 A. No. We are using the exact same method,

20:38:16 19 except the ISO 22262-2 says use heavy density liquid

20:38:22 20 of 2.85, if I remember, and Blount had said 2.81.

20:38:30 21 So now I have a method that specifically

20:38:32 22 uses 2.85 that we have been using under Blount.

20:38:37 23 Q. For the Johnson & Johnson MDL samples, I

20:38:43 24 think you testified that some of those containers had

20:38:48 25 been previously opened?

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20:38:51 1 MS. O'DELL: Object to the form.

20:38:53 2 THE WITNESS: Well, they got previously

20:38:55 3 opened when they were split. I don't have any

20:38:59 4 history on what Johnson & Johnson did with

20:39:03 5 those, but certainly when they got split up in

20:39:06 6 New Jersey for samples, they were opened in some

20:39:10 7 manner.

20:39:10 8 Q. (By Mr. Prost) The Imerys samples, the

20:39:12 9 railcar samples, I haven't seen any photographs of

20:39:16 10 those, and I think when we talked last time you said

20:39:19 11 you could produce those?

20:39:20 12 A. Oh, I forgot. Yes.

20:39:21 13 Q. You do have photos of those somewhere that

20:39:23 14 you can produce them?

20:39:23 15 A. Yes. It should -- I'll endeavor to get

20:39:27 16 those.

20:39:27 17 Q. All right. I guess we'll ask that those

20:39:30 18 be produced.

20:39:30 19 You're not familiar with how Imerys stored

20:39:35 20 those samples before they were produced; right?

20:39:38 21 A. No.

20:39:38 22 Q. Or what specific mines they came out of?

20:39:42 23 MS. O'DELL: Object to the form.

20:39:43 24 THE WITNESS: Well, I guess it would be

20:39:45 25 easy to track down if there is information and

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20:39:49 1 testimony about when different mines were

20:39:52 2 started and stopped.

20:39:53 3 Q. (By Mr. Prost) Your opinion on fibers per

20:40:09 4 gram and your extrapolation from what you found in

20:40:12 5 the samples, am I correct that you are assuming that

20:40:17 6 the asbestos contamination is consistent throughout

20:40:21 7 the entire sample?

20:40:23 8 A. The accessory mineral -- the findings of

20:40:25 9 the asbestos accessory minerals is consistent

20:40:30 10 throughout. That's not me assuming it. That's the

20:40:33 11 protocol. Because all TEM analysis, air samples,

20:40:37 12 water samples, when you filter it or pull through a

20:40:40 13 filter, you make that assumption.

20:40:41 14 Q. Your calculations assume that the fibers

20:40:44 15 are present at the same levels and evenly distributed

20:40:48 16 throughout every milligram of the sample; is that

20:40:53 17 right?

20:40:53 18 MR. CIRSCH: Object to form.

20:40:54 19 THE WITNESS: That there will be -- this

20:40:55 20 is what the range is that we should find, as we

20:41:00 21 talked about ad nauseam -- I'm sorry -- we

20:41:04 22 talked about earlier.

20:41:05 23 If we found one and analyzed it again and

20:41:07 24 found zero, that would not be surprising because

20:41:10 25 we're right at the detection limit. But if we

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20:41:12 1 found a significant number, 10, 15, 25, I would

20:41:17 2 expect that we would find positive samples in

20:41:19 3 each and every -- if we were to do that and do

20:41:22 4 that for some time, that there is enough in

20:41:26 5 there that would make that where we would find

20:41:28 6 similar concentrations.

20:41:29 7 Q. (By Mr. Prost) So at the detection limit

20:41:34 8 level where you're only finding a couple of fibers,

20:41:38 9 you wouldn't be surprised to examine the same sample

20:41:42 10 and not have a nondetect; is that right?

20:41:44 11 A. That wouldn't surprise me, and it wouldn't

20:41:46 12 surprise me if we had found two fibers the first time

20:41:49 13 or two asbestos -- regulated asbestos structures the

20:41:52 14 first time and next time you find four. So you will

20:41:54 15 have a range at those lower detection limits.

20:41:58 16 Q. Have you ever done a study to verify the

20:42:02 17 consistency of distribution throughout an entire

20:42:06 18 sample?

20:42:06 19 A. No. On the distribution and consistency

20:42:10 20 we haven't done any additional analysis that anybody

20:42:13 21 else has ever done in the past for analyzing these

20:42:17 22 same type of samples other than we're using a more

20:42:21 23 sensitive method.

20:42:21 24 Q. You were shown an EDS -- EDXA spectra. I

20:42:25 25 think it was Exhibit 12 maybe, if you could pull that

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20:42:30 1 up.
20:42:41 2 MR. CIRSCH: You can use this one for now.
20:42:43 3 THE WITNESS: Oh, thank you.
20:42:44 4 Q. (By Mr. Prost) You were asked some
20:42:45 5 questions about how at the bottom there's references
20:42:47 6 to the different -- what do you call it -- not
20:42:51 7 minerals -- the components. You see what I'm talking
20:42:55 8 about at the very bottom?
20:42:59 9 A. **In the bottom left-hand corner?**
20:43:01 10 Q. Correct.
20:43:02 11 A. **Yes.**
20:43:02 12 Q. Thanks.
20:43:03 13 And you said, I think, that you weren't
20:43:05 14 sure if the software automatically pulled up those
20:43:07 15 calculations or the ratios, the different numbers; is
20:43:10 16 that right?
20:43:12 17 A. **That's correct.**
20:43:13 18 Q. All right.
20:43:14 19 A. **It's not so much the ratios; it's that you**
20:43:17 20 **can do it by elemental percentage or the oxides.**
20:43:20 21 Q. If the software automatically pulled that
20:43:23 22 up, your analyst wouldn't delete it before they
20:43:25 23 printed that, would they?
20:43:25 24 MR. CIRSCH: Object to form.
20:43:28 25 THE WITNESS: No. If it is on there for
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20:43:30 1 that particular software, it would be a toggle
20:43:33 2 switch they would either turn on or turn off.
20:43:35 3 What's more important is we're following
20:43:36 4 the ISO method for quantitative EDS where we
20:43:41 5 have collected the appropriate count times.
20:43:44 6 Q. (By Mr. Prost) So the analyst could flip
20:43:46 7 a switch, and it could produce those specific
20:43:49 8 calculations for us?
20:43:51 9 A. **I don't know that.**
20:43:52 10 MR. CIRSCH: Object.
20:43:53 11 THE WITNESS: It was talked about at
20:43:55 12 length earlier. It's not something we routinely
20:43:57 13 do or I'm relying on.
20:44:03 14 Q. (By Mr. Prost) Is there anything else
20:44:04 15 that you can think of where there's a switch that you
20:44:08 16 could turn off information that the software was to
20:44:10 17 automatically put on there?
20:44:12 18 MS. O'DELL: Object to form.
20:44:13 19 MR. CIRSCH: Objection.
20:44:13 20 THE WITNESS: I never stated that the
20:44:16 21 software automatically wants to do it and the
20:44:18 22 analysts are fighting with the software where
20:44:21 23 the software is saying, no, no, I need to do
20:44:22 24 this.
20:44:22 25 Q. (By Mr. Prost) I'll rephrase the
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20:44:23 1 question.
20:44:23 2 Are you aware of any other information
20:44:25 3 that is available on the software that is not on
20:44:29 4 there or that there's a switch that has turned it
20:44:32 5 off?
20:44:32 6 A. **Again, as I discussed earlier some many**
20:44:35 7 **hours ago, that I would have to check, if my client**
20:44:40 8 **asks. And if my client asks for me to check, I'll**
20:44:42 9 **certainly take it under serious consideration.**
20:44:45 10 MR. PROST: That's all I have for now.
20:44:46 11 THE WITNESS: Thank you.
20:44:47 12 MR. PROST: Alex, do you have some more
20:44:49 13 questions?
20:44:49 14 MR. CHACHKES: No.
20:45:00 15 (Recess from 8:45 p.m. to 8:55 p.m.)
20:56:20 16 EXAMINATION
20:56:25 17 BY MS. O'DELL:
20:56:25 18 Q. Dr. Longo, it's been a very long day,
20:58:09 19 but --
20:58:10 20 A. **Yes, ma'am, it has.**
20:58:11 21 Q. It has, I know, for you. I have a few
20:58:14 22 questions for you.
20:58:16 23 First, before we begin, would you please
20:58:19 24 describe your educational background, your background
20:58:24 25 and expertise.
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20:58:26 1 A. **Yes. My educational background is that I**
20:58:31 2 **graduated from the University of Florida with a**
20:58:32 3 **bachelor's of science in microbiology. Went on to**
20:58:35 4 **graduate school in the materials science department**
20:58:38 5 **and graduated in 1983 with a Ph.D. in materials**
20:58:41 6 **science and engineering.**
20:58:42 7 **I started a small company, and we were one**
20:58:45 8 **of the first TEM labs in the country that specialized**
20:58:48 9 **in the analysis of asbestos by transmission electron**
20:58:53 10 **microscopy. Went on to in 1988 open the doors of**
20:58:57 11 **Materials Analytical Services and have been there**
20:59:00 12 **ever since as president.**
20:59:01 13 **While I was at the University of Florida,**
20:59:03 14 **I stayed on while I started that first little company**
20:59:06 15 **and eventually became visiting assistant professor at**
20:59:10 16 **the University of Florida, which I gave up that**
20:59:12 17 **position in approximately 1986 or so.**
20:59:17 18 **Materials Analytical Services grew at some**
20:59:20 19 **point to almost 80 employees, where we specialized in**
20:59:24 20 **everything from analysis of asbestos to materials to**
20:59:29 21 **semiconductors, even doing work for the Department of**
20:59:33 22 **Defense on various types of contracts.**
20:59:37 23 **Since that time, we've probably analyzed**
20:59:41 24 **somewhere in the order of 300,000 or 400,000**
20:59:44 25 **individual asbestos samples. We worked with various**
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20:59:49 **1 states and agencies in litigation for property damage**
 20:59:52 **2 and developed techniques for reverse engineering**
 20:59:56 **3 asbestos-containing products so you could identify**
 20:59:57 **4 the manufacturer.**
 20:59:59 **5 And I was the expert for the City of**
 21:00:02 **6 New York, the State of New York, the State of Hawaii,**
 21:00:08 **7 the State of Utah, the City of Chicago, plus the**
 21:00:13 **8 entire school system and public buildings in the**
 21:00:18 **9 State of Texas.**
 21:00:20 **10 We were the referee lab for the**
 21:00:23 **11 bankruptcies that involved both U.S. Gypsum,**
 21:00:25 **12 W.R. Grace, U.S. Mineral as well -- additionally,**
 21:00:29 **13 Turner & Newall's Limpet, as the referee lab where if**
 21:00:33 **14 somebody had made a claim, it was up to us to**
 21:00:36 **15 validate that the particular sample coming out of a**
 21:00:39 **16 particular building was, in fact, that manufacturer's**
 21:00:44 **17 product.**
 21:00:44 **18 I have published in the peer-reviewed**
 21:00:47 **19 literature on the types of testing that we've done**
 21:00:50 **20 for both asbestos and nonasbestos type products.**
 21:00:55 **21 I have taught at the American Industrial**
 21:01:01 **22 Hygiene Association for teaching other industrial**
 21:01:04 **23 hygienists the utility of transmission electron**
 21:01:06 **24 microscopy specifically for asbestos as well as other**
 21:01:09 **25 industrial hygiene applications for particle size**
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21:01:13 **1 analysis, fugitive type particulates for air quality.**
 21:01:20 **2 Our laboratory is one of the few in the**
 21:01:23 **3 country that does VOC testing for all the green**
 21:01:27 **4 labeling. We're certified to do that by the ISO**
 21:01:30 **5 certification.**
 21:01:31 **6 Our laboratory also has an FDA laboratory**
 21:01:34 **7 number so that we do do pharmaceutical or UPS type**
 21:01:40 **8 testing to verify, typically, different chemicals and**
 21:01:47 **9 materials that may be emitted or inhaled or injected**
 21:01:52 **10 or taken by mouth.**
 21:01:54 **11 I've been doing this for almost 30 years,**
 21:01:57 **12 and my specialty has been and my research over the**
 21:02:01 **13 years has been asbestos-containing products and the**
 21:02:05 **14 propensity or not to cause significant exposure**
 21:02:08 **15 during the use of those products.**
 21:02:11 **16 I was the primary author of the ASTM**
 21:02:15 **17 Method for the Analysis of Asbestos Fibers and**
 21:02:18 **18 Bundles in Settled Dust, the D2205 committee for ASTM**
 21:02:26 **19 standard method, which is probably the most rigorous**
 21:02:30 **20 peer-reviewed methodology outside of ISO.**
 21:02:33 **21 To get your committee -- your**
 21:02:38 **22 subcommittee, your committee, and eventually all**
 21:02:42 **23 40,000 members have the ability for the final time**
 21:02:47 **24 when it becomes a standard to vote negative on it.**
 21:02:52 **25 One negative vote sends it back. I did that once. I**
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21:02:56 **1 won't do it again.**
 21:02:57 **2 And I'm a member of various organizations.**
 21:03:03 **3 The American Industrial Hygiene Association, the**
 21:03:13 **4 microscopy -- materials science microscopy, as well**
 21:03:16 **5 as I'm a board certified forensic engineer, which is**
 21:03:19 **6 not just pay your money; you actually have to qualify**
 21:03:22 **7 from your experience and renew that. I finally**
 21:03:26 **8 became a fellow in forensic engineering for what I**
 21:03:30 **9 do.**
 21:03:31 **10 I guess that's it.**
 21:03:32 **11 Q. Have you been qualified as an expert in**
 21:03:37 **12 asbestos testing and allowed to testify in federal**
 21:03:42 **13 court?**
 21:03:42 **14 A. Yes. I've been in federal court many**
 21:03:46 **15 times on our asbestos type work, and in fact I've had**
 21:03:49 **16 a handful of appellate opinions that the methodology**
 21:03:53 **17 we use is sound science. I've been qualified as both**
 21:03:57 **18 a materials scientist in the areas of microscopy, in**
 21:04:02 **19 the areas of asbestos analysis, in the areas of**
 21:04:06 **20 industrial hygiene specifically to do with asbestos.**
 21:04:09 **21 And I'm still not a certified industrial hygienist.**
 21:04:12 **22 Q. What were you asked to do in this case?**
 21:04:15 **23 A. I was asked to determine, using standard**
 21:04:18 **24 protocols, peer-reviewed protocols that are normally**
 21:04:22 **25 used for the determination of asbestos in materials,**
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21:04:27 **1 air, bulk samples, water samples, what have you, if**
 21:04:31 **2 there was in fact regulated asbestos in these**
 21:04:35 **3 containers of Johnson & Johnson Baby Powder, Shower**
 21:04:43 **4 to Shower during the time that Johnson & Johnson was**
 21:04:47 **5 manufacturing that before they sold it to Valeant,**
 21:04:51 **6 Valeant Pharmaceuticals.**
 21:04:53 **7 And using standard methodology to**
 21:04:56 **8 determine if there was detectable amounts of**
 21:04:58 **9 regulated asbestos in these containers, historical**
 21:05:02 **10 containers as well as more contemporary containers.**
 21:05:08 **11 For this particular case for the MDL we have not**
 21:05:13 **12 gotten to the MDL China mines but to verify if it**
 21:05:18 **13 was, in fact, present or not.**
 21:05:20 **14 Q. Okay. Is the methodology that you used in**
 21:05:25 **15 your work in this case supported by the peer-reviewed**
 21:05:32 **16 literature?**
 21:05:32 **17 A. Yes. We're using standard protocols that**
 21:05:34 **18 other scientists in the field of asbestos testing**
 21:05:36 **19 have used in the years.**
 21:05:38 **20 If there's a publication involving**
 21:05:40 **21 asbestos analysis of some sort or asbestos in some**
 21:05:44 **22 product or asbestos release, the protocols that we**
 21:05:49 **23 use are typically referenced in those peer-reviewed**
 21:05:51 **24 publications as well as these are standards, standard**
 21:05:55 **25 testing protocols that are accepted across the**
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21:05:59 **1 country for these types of analysis and across the**
 21:06:02 **2 world, especially the International Standards**
 21:06:05 **3 organization protocols that we use.**
 21:06:07 **4 Q.** And is that because of the methodology
 21:06:08 **5** that you use and because of the fact that it's
 21:06:12 **6** generally accepted in the scientific community, is
 21:06:14 **7** the process that you undertook here something that
 21:06:18 **8** could be replicated by another scientist or lab?
 21:06:24 **9** MR. PROST: Objection --
 21:06:24 **10** MR. SILVER: Objection to form.
 21:06:24 **11** MR. CHACHKES: Objection. Leading.
 21:06:26 **12** MS. WOODS: Join.
 21:06:26 **13** THE WITNESS: Absolutely. They just would
 21:06:28 **14** follow the methodology that we have laid out in
 21:06:29 **15** the reference protocols, and as long as they are
 21:06:32 **16** qualified that they can do this type of
 21:06:34 **17** analysis, they should all be able to be
 21:06:37 **18** replicated.
 21:06:39 **19 Q.** (By Ms. O'Dell) Let's talk about your
 21:06:40 **20** results just very briefly.
 21:06:45 **21** What were your find -- let me back up and
 21:06:48 **22** ask this question.
 21:06:49 **23** What time period did the samples you
 21:06:51 **24** tested for your January 2019 report, what time period
 21:06:56 **25** does that cover?
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21:06:58 **1 A. The 1960s, the 1970s, the 1980s, the**
 21:07:03 **2 1990s, and the early 2000s.**
 21:07:05 **3 Q.** What were the sources from which talc was
 21:07:08 **4** mined?
 21:07:10 **5 A. The '60s up until about '67 or so would be**
 21:07:13 **6 from Italy; from there to approximately 2002, 2003,**
 21:07:21 **7 it would be from Vermont; and after that it's from**
 21:07:24 **8 China.**
 21:07:25 **9 Q.** What were your findings regarding
 21:07:27 **10** regulated asbestos fibers?
 21:07:29 **11 A. Our results overall for 72 what I'll call**
 21:07:35 **12 historical containers that include 15 historical**
 21:07:38 **13 railroad car samples from Imerys, and out of that 72**
 21:07:44 **14 samples, 50 were positive for regulated asbestos, and**
 21:07:48 **15 that gives you a percentage of approximately**
 21:07:50 **16 66 percent or so.**
 21:07:52 **17 If we break it down -- and, oh, that**
 21:07:54 **18 includes seven MDL samples that came from the Korean**
 21:08:00 **19 mine, or what we call the Asian talc.**
 21:08:04 **20 If we break it down for the Johnson's Baby**
 21:08:08 **21 Powder, we analyzed 34 historical samples with Asian.**
 21:08:13 **22 Out of that 34, 24 were positive, or 71 percent.**
 21:08:18 **23 We also analyzed 23 historical Shower to**
 21:08:21 **24 Shower containers that were Johnson & Johnson, and 18**
 21:08:25 **25 were positive, or 78 percent.**
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21:08:28 **1 Of the 15 Imerys railroad car samples,**
 21:08:31 **2 eight were positive, or 53 percent.**
 21:08:36 **3 Excluding the seven Asian Johnson Baby**
 21:08:40 **4 Powder containers would give us 65 Johnson Baby**
 21:08:43 **5 Powder and STS and Imerys railroad car samples**
 21:08:47 **6 analyzed; 44 were positive, or 68 percent, for**
 21:08:49 **7 amphibole asbestos.**
 21:08:51 **8 And then we have a break -- then, of**
 21:08:53 **9 course, we have the breakdown of each of these**
 21:08:57 **10 without the Asian.**
 21:08:58 **11 Q.** What were the results for fibrous talc?
 21:09:04 **12 A. The qualitative analysis of fibrous**
 21:09:10 **13 talc -- let me just jump to the results section.**
 21:09:16 **14 Q.** Page 9.
 21:09:18 **15 A. Thank you. Been a long day.**
 21:09:21 **16 Q.** Sure.
 21:09:22 **17 A. Using the ISO PLM method, found that of**
 21:09:32 **18 the 56 Italian/Vermont/China source containers that**
 21:09:36 **19 we analyzed, 55, or 98 percent, contained fibrous**
 21:09:41 **20 talc. The Blount PLM method showed of the 72, 20**
 21:09:45 **21 contained fibrous talc.**
 21:09:47 **22 The TEM analysis showed that -- and I have**
 21:09:54 **23 that somewhere -- that there was similar**
 21:09:56 **24 concentration by the heavy density liquid method by**
 21:10:01 **25 TEM, which is biased against finding fibrous talc,**
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21:10:06 **1 because unless it has iron in it, you'll have the**
 21:10:09 **2 same density as platy talc.**
 21:10:12 **3 So, really, the best predictor of fibrous**
 21:10:16 **4 talc would be the ISO PLM that does not use heavy**
 21:10:20 **5 density liquid, and most all the samples except for**
 21:10:23 **6 one that we tested had it in there.**
 21:10:42 **7 MS. O'DELL: Nothing further, Doctor.**
 21:10:43 **8 Thank you.**
 21:10:45 **9 THE WITNESS: Thank you.**
 21:10:47 **10 MR. CHACHKES: Nothing more here.**
 21:10:50 **11 FURTHER EXAMINATION**
 21:10:52 **12 BY MR. PROST:**
 21:10:52 **13 Q.** Just one follow-up.
 21:10:53 **14** You're talking about the results,
 21:10:54 **15** Dr. Longo. Turn to page 6 of your report.
 21:10:58 **16** You talk about how the analysis of 34
 21:11:01 **17** historical Johnson's Baby Powder containers you
 21:11:06 **18** determined were 71 percent positive.
 21:11:09 **19** And then number 2, you say the analysis of
 21:11:11 **20** 22 historical Shower to Shower, or 77 percent,
 21:11:16 **21** positive; but the analysis of the Imerys 15 railroad
 21:11:19 **22** car samples were only 53 percent positive.
 21:11:23 **23** Do you have an explanation for the
 21:11:28 **24** 25 percent difference there between the Imerys
 21:11:31 **25** railroad car samples and the finished product
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21:11:34 **1** samples?

21:11:34 **2** **A. Yes, sir.**

21:11:36 **3** **Q.** What is that?

21:11:36 **4** **A. Only eight were positive out of the 15.**

21:11:40 **5** **Q.** Do you have an explanation for why there

21:11:43 **6** would be such a discrepancy in the positive findings

21:11:46 **7** using your methodology?

21:11:47 **8** MS. O'DELL: Object to the form.

21:11:48 **9** THE WITNESS: I don't look at it as a

21:11:49 **10** discrepancy. We call them like we see it. So

21:11:52 **11** if it's only eight out of the 15, that's all we

21:11:55 **12** saw.

21:11:57 **13** **Q.** (By Mr. Prost) And you expect that if the

21:11:58 **14** raw talc supplied had a certain percentage of

21:12:02 **15** asbestos, you would see the same percentage in the

21:12:04 **16** finished product?

21:12:05 **17** MS. O'DELL: Object to form.

21:12:07 **18** THE WITNESS: No, I wouldn't expect to see

21:12:09 **19** the same percentage, usually, because you're --

21:12:11 **20** flotation, you're using various methods. And we

21:12:16 **21** don't have a lot of data from the 1990s. So

21:12:23 **22** there may be, you know, a difference in the two.

21:12:26 **23** But we don't have enough data to make that yet,

21:12:29 **24** to make that jump on why one versus the other.

21:12:33 **25** **Q.** (By Mr. Prost) So your opinion as to what

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21:12:35 **1** could explain the difference is that there's a

21:12:38 **2** flotation method and it's a small sample size?

21:12:41 **3** **A. No. I never said that. I said there is a**

21:12:44 **4** **processing on it, but we don't have a lot of samples**

21:12:46 **5** **from 1990 and 2000. And, you know, we'll just have**

21:12:51 **6** **to see as we go forward with additional testing.**

21:12:55 **7** **Q.** So the smaller the sample size, the less

21:12:57 **8** reliable the findings, you would agree?

21:13:00 **9** **A. No --**

21:13:00 **10** MS. O'DELL: Object to form.

21:13:00 **11** THE WITNESS: I don't agree that the

21:13:02 **12** findings are not reliable at all. They are

21:13:03 **13** reliable. Why there's 53 percent versus some of

21:13:06 **14** the others, you know, hopefully we can answer

21:13:10 **15** this question some day. Or we get a larger

21:13:17 **16** sample size and see if there is actually a

21:13:17 **17** difference.

21:13:17 **18** MR. PROST: No further questions.

21:13:22 **19** MR. SILVER: Hold on. Yes, we do. We

21:13:23 **20** have one more. We can feed it to him or just

21 ask him.

22 THE WITNESS: Why don't you just go ahead

21:13:27 **23** and ask me.

24 / / /

25 / / /

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21:13:27 **1** EXAMINATION

21:13:27 **2** BY MR. SILVER:

21:13:27 **3** **Q.** Dr. Longo, in your report you characterize

21:13:29 **4** the Imerys samples as railcar samples. Where did you

21:13:32 **5** get that description from?

21:13:33 **6** **A. It was on the -- I believe it was right on**

21:13:36 **7** **the containers as well as from the MDL for the chain**

21:13:40 **8** **of custodies that they sent.**

21:13:42 **9** **Q.** And sitting here today, you believe that

21:13:43 **10** all those samples were actually railcar samples?

21:13:47 **11** MS. O'DELL: Object to the form.

21:13:48 **12** THE WITNESS: I don't know if they all

21:13:49 **13** were. We'd have to look at the chain of

21:13:51 **14** custodies. But I think there were one or two

21:13:53 **15** that said something different than railroad car

21:13:57 **16** samples, but I just characterized them all as

21:14:00 **17** railroad car samples.

21:14:01 **18** MR. SILVER: Thank you. No further

21:14:03 **19** questions.

21:14:09 **20** (Deposition concluded at 9:14 p.m.)

21 (Pursuant to Rule 30(e) of the Federal

22 Rules of Civil Procedure and/or O.C.G.A. 9-11-30(e),

23 signature of the witness has been waived.)

24 (Original transcript sent to Mr. Frost.)

25

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1 C E R T I F I C A T E

2

3 STATE OF GEORGIA:

4 COUNTY OF HALL:

5

6 I hereby certify that the foregoing

7 transcript was taken down, as stated in the

8 caption, and the questions and answers thereto

9 were reduced to typewriting under my direction;

10 that the foregoing pages 1 through 359 represent

11 a true, complete, and correct transcript of the

12 evidence given upon said hearing, and I further

13 certify that I am not of kin or counsel to the

14 parties in the case; am not in the regular

15 employ of counsel for any of said parties; nor

16 am I in anywise interested in the result of said

17 case.

18 This, the 7th day of February, 2019.

19

20

21 _____

22 FRANCES BUONO, B-791

23 Georgia Certified Court Reporter

24

25

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